



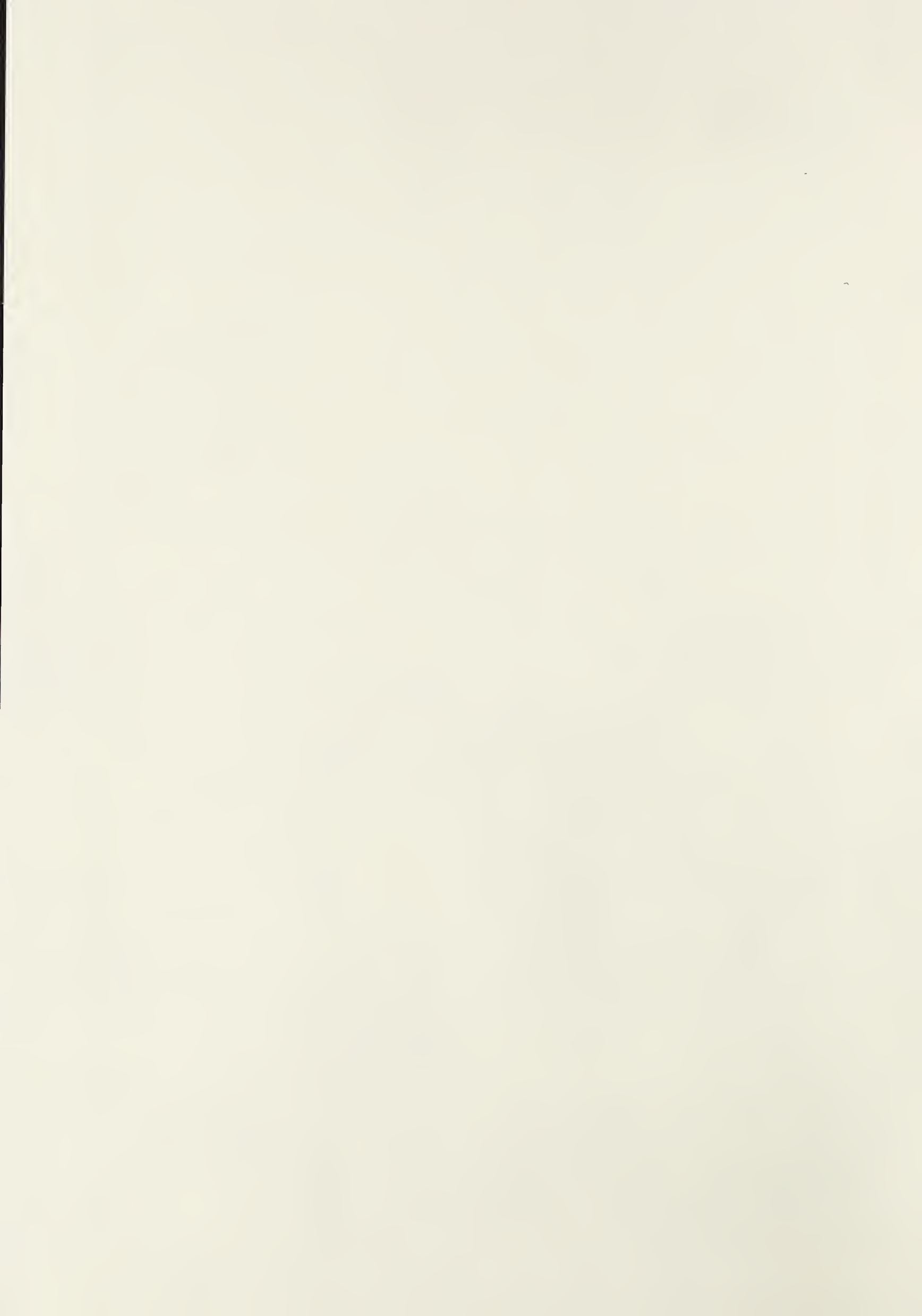
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*The Massachusetts Comprehensive
Assessment System:
Release of Spring 1999
Test Items*

Massachusetts Department of Education

Massachusetts Department of Education

This document was prepared by the Massachusetts Department of Education.
David P. Driscoll, Commissioner of Education

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Commissioner's Foreword

Dear Colleagues:

The Massachusetts Comprehensive Assessment System (MCAS) is the Commonwealth's statewide testing program for public school students, developed in response to the Education Reform Law of 1993. MCAS is based exclusively on the rigorous academic learning standards contained in the Massachusetts *Curriculum Frameworks*. These *Frameworks* and the MCAS program have been developed with the direct and active involvement of educators from across Massachusetts and with the support of the Board of Education. Together, the *Frameworks* and MCAS are designed to raise the academic achievement of all students in the Commonwealth.

The purpose of this document is to share with educators and the public all of the test items on which the 1999 MCAS student results are based. The release of these items provides considerable information regarding the kinds of knowledge and skills that students are expected to demonstrate on the MCAS tests. Local educators are encouraged to use this document in concert with their school's *Test Item Analysis Reports* to identify strengths and weaknesses in curriculum and instruction, and to guide the changes necessary to more effectively serve students.

You will find this document on the Internet at www.doe.mass.edu. Please note that, due to some publishers' restrictions on copyright permissions regarding materials included in the MCAS tests, the paper version of this document contains some MCAS test materials that are not included on the Internet version.

Thank you for your support for strengthening education for our students in Massachusetts.

Sincerely,



David P. Driscoll

Commissioner of Education

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I. Introduction

Massachusetts Department of Education

I. Introduction

Overview of MCAS Test Items

The Massachusetts Comprehensive Assessment System (MCAS) is the Commonwealth's statewide assessment program for public school students, developed in response to the Education Reform Law of 1993. MCAS is designed to promote high academic standards for all public school students across the Commonwealth by measuring student performance based on clear, uniform, statewide standards for content knowledge and skills.

Content Areas Tested

Four content areas were tested in the 1999 MCAS administration: English Language Arts (also abbreviated as "ELA" throughout this document); Mathematics; Science & Technology; and History and Social Science. Students in grades 4, 8, and 10 answered questions that were based exclusively on the learning standards defined in the Massachusetts *Curriculum Frameworks* for these content areas.¹ The questions assessed students' content knowledge and skills in these areas; because questions focused on learning standards identified for all grades up to and including the tested grade level, students were required to demonstrate **cumulative** content knowledge and skills on most MCAS questions.

In the content area of English Language Arts, two tests were administered separately at each tested grade:

- ELA Composition, administered April 26–30, 1999
- ELA Language and Literature, administered May 17–June 2, 1999

The Mathematics, Science & Technology, and History and Social Science tests, as well as the grade 4 History and Social Science Question Tryout, were also administered May 17–June 2, 1999.

In the content area of History and Social Science, grade 4 students participated only in a Question Tryout, for which no results will be reported.² Therefore, this document does not include common items from the grade 4 History and Social Science Question Tryout.

¹ See footnotes at the beginnings of chapters II through XII for specific *Framework* references. Some learning standards, including all learning standards in the *English Language Arts Curriculum Framework's Media* strand, cannot be assessed using the MCAS large-scale paper-and-pencil format and are therefore neither tested by MCAS nor included in this document.

² History and Social Science test results will be reported in 1999 as follows:

- No results will be reported for the grade 4 Question Tryout.
- Grade 8 results will be fully reported.
- Grade 10 results will be reported only at the student level in the *History and Social Science Test Item Analysis Reports* issued to schools and districts; no aggregated results will be reported for schools or districts, and no performance level or scaled score results will be reported for individual students, schools, or districts.

Types of Questions

Four different types of questions (items) appear on MCAS:

- multiple-choice questions
- open-response questions
- short-answer questions
- writing prompts

Multiple-choice questions are included on all MCAS tests except the ELA Composition test, and require students to select the correct answer from a list of four options.

Open-response questions are also included on all MCAS tests except the ELA Composition test, and require students to generate, rather than recognize, a response. Depending on the content area being tested, students provide a written response of one to two paragraphs or create a chart, table, diagram, or graph.

Short-answer questions are currently included only on MCAS Mathematics tests, and require students to generate a brief response, usually a short statement or numeric solution to a computation.

Writing prompts appear only on MCAS English Language Arts Composition tests; at each tested grade level, students complete a written composition in response to a single writing prompt.

Common Items/Matrix-sampled Items

For the spring 1999 MCAS administration, each student at the tested grades was issued three MCAS Student Test Booklets, containing test items for their grade in one or two content areas, as follows:

- English Language Arts Composition
- English Language Arts Language and Literature/Mathematics
- Science & Technology/History and Social Science³

Students at each tested grade level responded to the same (common) writing prompt for the ELA Composition test. Therefore, there was only one form of the ELA Composition Student Test Booklet at each tested grade level.

³ Grade 4 Student Test Booklets contained the grade 4 History and Social Science Question Tryout questions.

There were 12 different forms of each of the other two Student Test Booklets at each tested grade level.⁴ Approximately 80% of the test items in any Student Test Booklet were **identical (common items)** in all 12 test forms. The remaining 20% of the test items in each Student Test Booklet **varied (matrix-sampled items)** from form to form.

Individual student test scores are based exclusively on **common items**.⁵ Therefore, in the interest of supporting the improvement of statewide student academic performance, the Massachusetts Department of Education annually releases all common test items to the public following each spring’s MCAS administration. Released materials are replaced with new items in the following year’s MCAS tests.

The **types and number** of test items administered in each grade and content area during the spring 1999 MCAS administration are shown in Tables 1, 2, and 3 below.

Table 1. Spring 1999 MCAS Administration Number of Test Items in Each Content Area by Item Type and Function Grade 4								
Item Type: MC = Multiple-choice Question OR = Open-response Question SA = Short-answer Question WP = Writing Prompt								
Item Function	Content Area							
	English Language Arts			Mathematics			Science & Technology	
	WP	MC	OR	MC	SA	OR	MC	OR
Common Questions (identical across all Student Test Booklet forms)	1	36	4	29	5	5	34	5
Matrix-sampled Questions (differing among the 12 Student Test Booklet forms)	N/A	12	2	7	1	1	7	1
Total Questions	1	48	6	36	6	6	41	6

⁴ In addition to the 12 forms of the Student Test Booklet in English, one form of the Student Test Booklet was available in each of three other versions (large-print, Braille, and Spanish-language) for use by eligible students. For further information on which students were eligible for testing in these versions, please refer to the MCAS fact sheet, “Requirements for Student Participation,” and the MCAS document, *UPDATE: Requirements for the Participation of Students with Disabilities* (1999). Both publications are available on the Department’s Internet site at www.doe.mass.edu/mcas.

⁵ MCAS reports of results include only data generated from responses to **common items**, with the exception of *School and District Reports*. In these reports, only the *Subject Area Subscore* pages include data generated from student responses to both common and matrix-sampled items. Matrix-sampled items serve two primary purposes: they are the basis for equating tests from year to year, which allows for longitudinal comparisons of performance; and, using a relatively modest amount of testing time, they efficiently sample a broader range of the curriculum than common items. Student responses to matrix-sampled items are aggregated at the school and district levels; those results are combined with common item results and reported in subject sub-areas (MCAS “reporting categories”) in the MCAS *School and District Reports*. In combining student results from both common and matrix-sampled items, these sub-area results provide an indication of how successfully schools and districts are addressing the breadth of the content areas in their curriculums.

Table 2. Spring 1999 MCAS Administration
Number of Test Items in Each Content Area by Item Type and Function
Grade 8

Item Function	Item Type: MC = Multiple-choice Question			OR = Open-response Question			SA = Short-answer Question			WP = Writing Prompt		
	Content Area											
	English Language Arts			Mathematics			Science & Technology			History and Social Science		
	WP	MC	OR	MC	SA	OR	MC	OR	MC	OR	MC	OR
Common Questions (identical across all Student Test Booklet forms)	1	36	4	29	5	5	34	5	34	5	5	
Matrix-sampled Questions (differing among the 12 Student Test Booklet forms)	N/A	12	2	7	1	1	7	1	7	1	1	
Total Questions	1	48	6	36	6	6	41	6	41	6	6	

Table 3. Spring 1999 MCAS Administration
Number of Test Items in Each Content Area by Item Type and Function
Grade 10

Item Function	MC = Multiple-choice Question		OR = Open-response Question			SA = Short-answer Question			WP = Writing Prompt			
	Content Area											
	English Language Arts			Mathematics			Science & Technology			History and Social Science		
	WP	MC	OR	MC	SA	OR	MC	OR	MC	OR	MC	OR
Common Questions (identical across all Student Test Booklet forms)	1	36	4	32	4	6	36	6	33	6		
Matrix-sampled Questions (differing among the 12 Student Test Booklet forms)	N/A	12	2	7	1	1	8	1	15	3		
Total Questions	1	48	6	39	5	7	44	7	48	9		

Document Purpose and Structure

Purpose

The purpose of this document is to share with educators and the public the **common** test items from the spring 1999 MCAS Student Test Booklets. Release of these items is intended to provide additional information regarding the kinds of knowledge and skills that students are expected to demonstrate on MCAS. Local educators will be able to use this information to identify strengths and weaknesses in their curriculum and instruction, and to guide the changes necessary to more effectively meet their students' needs.

This document is also intended to be used by school and district personnel as a companion document to the school- and district-level *Test Item Analysis Reports*. Each school receives multiple *Test Item Analysis Reports*: one for each content area at each grade level tested (e.g., grade 10 Mathematics). These reports provide data generated from student responses to common items only. Each report lists, for the school receiving the report, the names of all enrolled students in that grade, and shows how **each** student answered each common item in that content area. The report identifies whether each item was multiple-choice, open-response, short-answer, or a writing prompt, and identifies the item's MCAS reporting category. Item numbers in this document **correlate directly** to the "Item Numbers" in the *Test Item Analysis Reports*.

This document will also inform school and district personnel in their interpretation and use of results reported on the *Subject Area Subscore* pages of the 1999 *School and District Reports*. The *Subject Area Subscore* pages report results through MCAS reporting categories specific to each content area, and represent the only instance in which MCAS results from both common **and** matrix-sampled items are combined and reported.⁶

Structure

Each subsequent chapter of this document contains information for one grade level and one content area (e.g., Chapter II=Grade 4 English Language Arts). The English Language Arts chapter for each grade contains information for both the ELA Composition (Writing) and the ELA Language and Literature (Reading) tests for that grade.

The first section of each chapter lists the reporting categories under which results in that content area are reported to schools and districts, along with the related Massachusetts *Curriculum Framework* learning standards.⁷ Applicable *Framework* page numbers are also identified. History and Social Science chapters also list *Framework* core knowledge topics assessed by MCAS.

⁶ See note 5 for additional information on the purposes of matrix-sampled items.

⁷ Certain reporting categories/learning standards were not tested by MCAS common items in 1999, but were tested by MCAS matrix-sampled questions; these categories/standards are also included in this document.

The second section of each chapter contains all common test items for which results from the spring 1999 MCAS administration will be reported in that grade and content area. In Mathematics and Science & Technology chapters, each item is followed by a reference to the reporting category under which its results will be reported to schools and districts, along with the page(s) of this document where that reporting category may be found. English Language Arts chapters link items to specific learning standards. History and Social Science chapters also link items to learning standards, as well as to core knowledge topics, whenever applicable.

Correct answers for multiple-choice questions are indicated in this document by check marks. Correct answers for short-answer questions are shown in text boxes following the questions. An overview of procedures for scoring responses to open-response questions and writing prompts is presented in the MCAS fact sheet, “Facts on Scoring of Student Answers to Open-Response Questions and Writing Prompts,” which is available on the Department’s Internet site at www.doe.mass.edu/mcas. Scoring procedures for these items will also be explained further in the MCAS document, *Guide to Interpreting the Spring 1999 MCAS Reports for Schools and Districts*, due for release later in 1999. (A similar *Guide* is currently available on the Department’s Internet site for those 1998 MCAS reports.)

Materials in this document are shown in the same order in which they were presented in Student Test Booklets. The heading for each group of items indicates the spring 1999 MCAS test session within which those items appeared. Due to copyright licensing restrictions, certain common English Language Arts readings are not included in this document, and some readings included in the printed version of this document will not be included with its Internet version.

Materials are not formatted exactly as they appeared in Student Test Booklets. For instance, in order to present items most efficiently in this document, the following modifications have been made:

- Some fonts and/or font sizes have been changed and/or reduced.
- Some graphics that appeared above questions in Student Test Booklets are shown instead to the side. In these instances, text indicating the position of the graphic may be modified or deleted in the question or directions as they appear in this document.
- Most graphics have been reduced in actual size from, but maintain the same proportions as, those that appeared in Student Test Booklets.

To supplement the chapters of this document containing the common Mathematics test items for each grade (chapters V, VI, and VII), copies of the grade 4 Mathematics Tool Kit and the grades 8 and 10 Mathematics Reference Sheets used by students during Mathematics test sessions are provided in Appendix A.

Additional Information on MCAS

Related Department Publications

This document is available on the Department of Education's Internet site at www.doe.mass.edu/mcas. However, due to copyright release restrictions, the Internet version of this document **does not include** certain English Language Arts Readings found in chapters II, III, and IV.

The following publications, as well as other Department publications, may also be found on the Department's Internet site. Most are also available at your local public library.

- *English Language Arts Curriculum Framework* (1997)
- *Mathematics Curriculum Framework: Achieving Mathematical Power* (1996)
- *Science & Technology Curriculum Framework: Owning the Questions Through Science & Technology* (1996)
- *History and Social Science Curriculum Framework* (1997)

- *Guide to the Massachusetts Comprehensive Assessment System: English Language Arts* (1998)
- *Guide to the Massachusetts Comprehensive Assessment System: Mathematics* (1998)
- *Guide to the Massachusetts Comprehensive Assessment System: Science & Technology* (1998)
- *Guide to the Massachusetts Comprehensive Assessment System: History and Social Science* (1999)

- *The Massachusetts Comprehensive Assessment System: UPDATE—Requirements for the Participation of Students with Disabilities [A Guide for Educators and Parents]* (1999)
- *Question and Answer Guide on the Statewide Testing Program* (1998)
- *A Student's Question and Answer Guide on the Statewide Testing Program* (1998)

MCAS Support Services

For further information about the Massachusetts Comprehensive Assessment System, please contact MCAS Support Services at

(800) 737-5103

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II. English Language Arts, Grade 4

A. Composition

B. Language and Literature

Massachusetts Department of Education

Curriculum Framework *Learning Standards/* *MCAS Reporting Categories*

A. English Language Arts Composition *Grade 4*

The 1999 MCAS English Language Arts Composition (Writing) test was based on the learning standards of the *Composition* strand of the Massachusetts *English Language Arts Curriculum Framework*.⁸

ELA Composition test results are reported under the MCAS reporting category of *Composition*.

The learning standards for the *Composition* strand are listed below and are directly quoted from the *Framework*; applicable *Framework* page numbers are shown in parentheses. The ELA Composition writing prompt is based on all four of the *Composition* strand learning standards.

Composition (*Framework*, pp. 56–60)

Learning Standard 19

Students will write compositions with a clear focus, logically related ideas to develop it, and adequate detail.

Learning Standard 20

Students will select and use appropriate genres, modes of reasoning, and speaking styles when writing for different audiences and rhetorical purposes.

Learning Standard 21

Students will demonstrate improvement in organization, content, paragraph development, level of detail, style, tone, and word choice (diction) in their compositions after revising them.

Learning Standard 22

Students will use knowledge of standard English conventions to edit their writing.

⁸ Massachusetts Department of Education, *English Language Arts Curriculum Framework* (Malden, 1997).

MCAS Spring 1999 Common Test Items

A. English Language Arts Composition

Grade 4

Test Administration Sessions

MCAS Student Test Booklets included 2 separate ELA Composition test sessions, administered on the same day with a short break between sessions. During the first session, each student wrote a first draft of a composition in response to the following writing prompt. During the second session, each student revised his/her first draft and submitted his/her second draft for scoring.

Reference Materials and Tools

At least one dictionary per classroom was provided for student use during ELA Composition test sessions. No other reference materials or tools were allowed during either ELA Composition test session.

Grade 4 Writing Prompt

1. WRITING ASSIGNMENT

Some days are more fun than others. Describe a day that was great for you and tell WHY it was great. Include details so the reader can enjoy the day as much as you did.

Related Learning Standards for Item 1: **Learning Standards 19-22**

Curriculum Framework *Learning Standards/* *MCAS Reporting Categories*

B. English Language Arts Language and Literature *Grade 4*

The 1999 MCAS English Language Arts Language and Literature (Reading) test was based on the learning standards of two content strands of the Massachusetts *English Language Arts Curriculum Framework*:⁹

■ Language

■ Literature

These two *Framework* strands also serve as MCAS reporting categories for ELA Language and Literature test results.

The learning standards related to these two strands are listed below and are directly quoted from the *Framework*; applicable *Framework* page numbers are shown in parentheses. Each common item in the next section of this chapter is followed by a reference to the learning standard to which it is related.

Language (Framework, pp. 28–31)

Learning Standard 4

Students will acquire and use correctly an advanced reading vocabulary of English words, identifying meanings through an understanding of word relationships.

Learning Standard 5

Students will identify, describe, and apply knowledge of the structure of the English language and standard English conventions for sentence structure, usage, punctuation, capitalization, and spelling.

⁹ See note 8.

Learning Standard 6

Students will describe and analyze how oral dialects differ from each other in English, how they differ from written standard English, and what role standard American English plays in informal and formal communication.

Learning Standard 7

Students will describe and analyze how the English language has developed and been influenced by other languages.

Literature (Framework, pp. 38–50)

Learning Standard 8

Students will decode accurately and understand new words encountered in their reading materials, drawing on a variety of strategies as needed, and then use these words accurately in . . . writing.

Learning Standard 9

Students will identify the basic facts and essential ideas in what they have read, heard, or viewed.

Learning Standard 10

Students will identify, analyze, and apply knowledge of the characteristics of different genres.

Learning Standard 11

Students will identify, analyze, and apply knowledge of theme in literature and provide evidence from the text to support their understanding.

Learning Standard 12

Students will identify, analyze, and apply knowledge of the structure and elements of fiction and provide evidence from the text to support their understanding.

Learning Standard 13

Students will identify, analyze, and apply knowledge of the structure, elements, and meaning of nonfiction or informational material and provide evidence from the text to support their understanding.

Learning Standard 14

Students will identify, analyze, and apply knowledge of the structure, elements, and theme of poetry and provide evidence from the text to support their understanding.

Learning Standard 15

Students will identify and analyze how an author's choice of words appeals to the senses, creates imagery, suggests mood, and sets tone.

Learning Standard 16

Students will compare and contrast similar myths and narratives from different cultures and geographic regions.

Learning Standard 17

Students will interpret the meaning of literary works, nonfiction, films, and media by using different critical lenses and analytic techniques.

MCAS Spring 1999 Common Test Items

B. English Language Arts Language and Literature Grade 4

Test Administration Sessions

MCAS Student Test Booklets included 3 separate ELA Language and Literature test sessions. Each session included selected readings, followed by multiple-choice and open-response questions.

Reference Materials and Tools

No reference materials or tools were allowed during any ELA Language and Literature test session.

Session 1, Reading Selection #1

This story is about Russ and his nephew, Tommy, who work on a lobster boat named the Nellie Jean. As you read, think about why fishing is an important industry in the Northeast. Then, answer the questions that follow.

Lobster Boat

by Brenda Z. Guiberson

Students read a passage titled "Lobster Boat" and then answered questions 2 through 10.

Due to copyright restrictions, the passage cannot be released to the public in this document.

Reading Passage:

Excerpt from *Lobster Boat* by Brenda Z. Guiberson. Copyright © 1993 by Brenda Z. Guiberson, illustrations © 1993 by Megan Lloyd.
Published by Henry Holt.

Students read a passage titled "Lobster Boat" and then answered questions 2 through 10.

Due to copyright restrictions, the passage cannot be released to the public in this document.

Reading Passage:

Excerpt from *Lobster Boat* by Brenda Z. Guiberson. Copyright © 1993 by Brenda Z. Guiberson, illustrations © 1993 by Megan Lloyd.

Published by Henry Holt.

Session 1, Multiple-choice Questions

2. In the introduction, *Lobster Boat* gives background information mainly about
- A. lobster boats.
 - B. New England.
 - ✓ C. the fishing industry.
 - D. lobsters.

Related Learning Standard for Item 2: **Learning Standard 13 (p. 17)**

3. It seems like the story is happening as you read it because it
- ✓ A. is written in the present tense.
 - B. tells everything that happens.
 - C. uses several fishing terms.
 - D. does not tell how people are feeling or what they are thinking.

Related Learning Standard for Item 3: **Learning Standard 12 (p. 17)**

4. The crew of the *Nellie Jean* will probably move the traps to deeper water when
- A. it gets colder.
 - ✓ B. they stop catching so many lobsters.
 - C. they pull in their buoys.
 - D. old Sam moves his traps there.

Related Learning Standard for Item 4: **Learning Standard 12 (p. 17)**

5. The brass gauge that Tommy fits between the eye sockets and the end of the body shell is a tool for

- ✓ A. measuring.
- B. catching.
- C. cutting.
- D. cleaning.

Related Learning Standard for Item 5: **Learning Standard 8 (p. 17)**

6. Why does Tommy grab the lobsters from behind when he takes them out of the trap?

- A. to make it easy to notch their tails
- B. to avoid hurting their claws or antennae
- ✓ C. to keep from being hurt by their claws
- D. to check to see if they are males or females

Related Learning Standard for Item 6: **Learning Standard 12 (p. 17)**

7. How many lobster traps in all do Russ and Tommy check?

- A. twenty
- B. fifty
- C. one hundred
- ✓ D. more than one hundred

Related Learning Standard for Item 7: **Learning Standard 9 (p. 17)**

8. The word *squall* in "That squall has changed its mind and is headed right this way" means a
- A. kind of fishing boat.
 - ✓ B. storm.
 - C. kind of sea gull.
 - D. cloud.

Related Learning Standard for Item 8: **Learning Standard 8 (p. 17)**

9. "*Scree! Scree!*" is an example of words that
- ✓ A. imitate the sounds made by something.
 - B. are made up to show force.
 - C. imitate how something looks.
 - D. come from another language.

Related Learning Standard for Item 9: **Learning Standard 5 (p. 16)**

Session 1, Open-response Question

10. The author uses many descriptive words to make this story seem real.

Give two examples EACH from the story of the author's descriptive words for something SEEN, something HEARD, and something TOUCHED.

Related Learning Standard for Item 10: **Learning Standard 12 (p. 17)**

Session 1, Multiple-choice Questions

Use the meanings of the prefixes and roots in the box below to answer questions 11 through 13.

Understanding and Using the Meanings of Prefixes and Roots		
centi	=	100
milli	=	1000
tele	=	far
micro	=	small
bio	=	life
auto	=	self
phone	=	sound
ped	=	foot
meter	=	instrument for measuring
scope	=	instrument for observing
graph	=	writing or recording

11. A measurement of length equal to 1000th of a meter is a

- A. centimeter.
- ✓ B. millimeter.
- C. millipede.
- D. centipede.

Related Learning Standard for Item 11: **Learning Standard 4 (p. 16)**

12. To look at very small things, a person can use a

- A. telescope.
- ✓ B. microscope.
- C. radarscope.
- D. micrograph.

Related Learning Standard for Item 12: **Learning Standard 4 (p. 16)**

13. "Hydro" is a prefix that means "water." What word below means an instrument to measure water?

- A. hydrology
- ✓ B. hydrometer
- C. hydrosphere
- D. hydroelectric

Related Learning Standard for Item 13: **Learning Standard 4 (p. 16)**

Session 1, Reading Selection #2

This story tells about a boy who wanted to learn more about our first president. Read the story carefully. Then, answer the questions that follow.

George Washington's Breakfast

by Jean Fritz

George W. Allen was proud of two things. His name and his birthday.

George was named for George Washington. And he had the same birthday. February 22.

It made him feel almost related, he said.

It made him want to know everything about George Washington.

Already he knew quite a lot. He knew that Washington was a general and lived in Virginia and was six feet two inches tall. He was married to Martha and was the first President of the United States.

He knew that Washington rode two horses in the war. Blueskin and Nelson. And Nelson was his favorite because he was so steady in gunfire.

He also knew that Washington had ten hunting dogs. Their names were: Tipsey, Pompey, Harry, Maiden, Lady, Dutchess, Drunkard, Tru-Love, Mopsy, and Pilot.

Then one day at breakfast George Allen thought of something he didn't know. George's mother and father had gone to work, and his grandmother was frying eggs.

"Grandma," George said, "what did George Washington eat for breakfast?"

"Search me," his grandmother said.

"That was before my time." She put a plate of fried eggs in front of George.

"And don't ask me to help you find out."

George's grandmother knew what George was like. When George wanted to find out something, he didn't rest until he found out. He didn't let anyone else rest either. He was just like his grandfather used to be. Always asking questions. And George's grandmother wasn't going to fool around now with silly questions. Who cared about a breakfast that was eaten two hundred years ago? Besides, she had the spring housecleaning to do.

George pushed the eggs around his plate. "Well," he said, "if I find out, will you do one thing for me?"

"What's that?"

"Will you cook me George Washington's breakfast?"

George's grandmother looked at the clock. "George," she said, "you'll be late for school."

"But will you?"

George's grandmother was still looking at the clock. "I'll cook anything," she said. "Just hurry."

Session 1, Multiple-choice Questions

14. What kind of boy was George Allen?

- A. thoughtless
- B. funny
- C. forgetful
- ✓ D. curious

Related Learning Standard for Item 14: **Learning Standard 12 (p. 17)**

15. At the end of the story, what did George ask his grandmother to do?

- A. do her spring cleaning without his help
- B. help him find out what George Washington ate for breakfast
- C. watch the clock and make sure he was not late for school
- ✓ D. cook for him the same breakfast George Washington ate

Related Learning Standard for Item 15: **Learning Standard 9 (p. 17)**

16. Of what was George W. Allen very proud?

- A. He was related to George Washington.
- B. He knew a whole lot about George Washington.
- ✓ C. His first name and birthday were the same as George Washington's.
- D. He had the same breakfast as George Washington.

Related Learning Standard for Item 16: **Learning Standard 9 (p. 17)**

17. What does the *apostrophe* "s" mean in "George's grandmother"?

- A. It shows a contraction.
- ✓ B. It shows a possessive noun.
- C. It shows a proper noun.
- D. It shows a plural noun.

Related Learning Standard for Item 17: **Learning Standard 5 (p. 16)**

Session 1, Open-response Question

18. Name THREE specific sources George could use to find information to answer his question. If you were George, which source would you use first? Explain why.

Related Learning Standard for Item 18: **Learning Standard 10 (p. 17)**

Session 2, Reading Selection #1

Read this passage to learn about our American English language. Then, answer the questions that follow.

Doing Away with the King's English

compiled by Susan Lurie

Noah Webster wasn't satisfied when the British went home—he wanted to get rid of their language, too.



More than 265 million people speak English. In fact, more people speak English than any other language except Mandarin Chinese. People speak English all over the world. It's spoken in Great Britain, the United States, Canada, South Africa, Australia, New Zealand, several Pacific islands, and various parts of Africa and Asia. English is the most widely used of the world's major languages.

How did English get to be so big? English is the mother tongue of the British Isles. During the eighteenth and nineteenth centuries, the English were great explorers and colonizers, and wherever they went, they brought their language, which they called "the king's English."

Although many people speak English, they don't all pronounce it the same way or spell the words they use the same way. The United States, in particular, has its own special way of pronouncing and spelling the English language. We speak *American English*, and we owe a lot of its special character to one man: Noah Webster.

Noah Webster was born in Connecticut in 1758. He grew up during a period of great American patriotism. He graduated from Yale University when he was 20. By then, the American Revolution had begun, and young Noah

joined George Washington's army and helped fight the British.

The end of the American Revolution brought independence to the United States, but the political independence didn't satisfy Webster. He wanted Americans to be independent from England intellectually, too. He wanted to do away with "the king's English" and replace it with a special American language.

In 1783, Webster published a textbook called *The American Spelling Book*. Over the years, this book was printed many times. It was used by generation after generation of American schoolchildren. Because the book had a blue back, it became famous as "the blue-backed speller."

Webster also compiled a dictionary. His was the first American dictionary. It, too, became very popular and was updated and reprinted many times. It's known as "Webster's Dictionary," and it's still with us. Chances are, when you go to look up a word, you'll look it up in a new edition of Noah Webster's book.

In his books, Webster made many changes in the English used in the United

States. He suggested new ways to pronounce English words, and he added new, American words to our language. For example, one of those new words was *barbecue*.

Most of Webster's changes were in the way words should be spelled. Because we follow Webster's spellings, we spell many words differently from the way the English spell them. For instance, we write *center*, not *centre*, and *theater*, not *theatre*. We also leave the *u* out of words like *color*, *favor*, and *honor*. The English still spell these words *colour*, *favour*, and *honour*.

Webster made many other changes, most of which we use today. However, Webster did not go as far as his friend Benjamin Franklin wanted him to. Franklin wanted to drop all the silent letters from words. He also wanted to change the spellings of many words. Had Franklin written the dictionary instead of Webster, we would spell *give*, *giv*, and *wrong*, *rong*. Franklin really wanted to give us our own mother tongue — but he would have spelled it *tong*!

Session 2, Multiple-choice Questions

19. Why is English spoken in so many countries?

- A. More people are born in England than any other country.
- ✓ B. The English brought their language to lands they explored or colonized.
- C. People wanted to be like the English.
- D. English is easier to learn than most other languages.

Related Learning Standard for Item 19: **Learning Standard 9 (p. 17)**

20. What people are in the ships in the cartoon drawing?

- A. Americans
- ✓ B. English
- C. French
- D. Chinese

Related Learning Standard for Item 20: **Learning Standard 13 (p. 17)**

21. The writer puts *barbecue*, *colour*, and *give* in italics in the last three paragraphs to show that they are

- ✓ A. examples of what he's discussing.
- B. spelled wrong.
- C. important new words to learn.
- D. foreign words.

Related Learning Standard for Item 21: **Learning Standard 13 (p. 17)**

22. "Doing Away with the King's English" is an example of

- A. drama.
- B. fiction.
- ✓ C. nonfiction.
- D. poetry.

Related Learning Standard for Item 22: **Learning Standard 10 (p. 17)**

23. According to this passage, Ben Franklin would have changed the spelling of “knife” to

- A. niff.
- ✓ B. nif.
- C. knif.
- D. nife.

Related Learning Standard for Item 23: **Learning Standard 13** (p. 17)

24. Which words in the third paragraph are used as verbs?

- A. although, don’t, special
- B. same, spelling, character
- C. particular, pronouncing, spell
- ✓ D. speak, has, owe

Related Learning Standard for Item 24: **Learning Standard 5** (p. 16)

25. In the last paragraph of this passage, Webster and Franklin are always capitalized because they are

- A. at the beginnings of sentences.
- ✓ B. proper nouns.
- C. names of special places.
- D. common nouns.

Related Learning Standard for Item 25: **Learning Standard 5** (p. 16)

26. A character in a story who says “y’all come in and sit a spell” is probably from

- A. New England.
- B. California.
- ✓ C. the South.
- D. Iowa.

Related Learning Standard for Item 26: **Learning Standard 6** (p. 17) *[Note: Although this item followed item 25 above in Student Test Booklets, it is not related to the reading passage, “Doing Away with the King’s English.”]*

Session 2, Open-response Question

27. Ben Franklin wanted to drop all silent letters from words. Give one reason why this may have been a good idea and one reason why it may have been a bad idea.

Related Learning Standard for Item 27: **Learning Standard 13 (p. 17)**

Session 3, Reading Selection #1

The following poems are about trees. Read them and then answer the questions that follow.

It's Up to People

It's up to people to save all the trees
That still find a home in our woods.
Animals don't wield the power we do,
Though they'd certainly help if they could.

We'd see warthogs and pigs
To save fiddleleaf figs;
Baby chicks cheeping
To keep willows weeping;
Cats with a shine
For the loblolly pine;
Polars and pandas
To save jacarandas;
Even queen bees and princesses
For photosynthesis.

But it's up to people to save all the trees
That still find a home in our woods.
Animals don't wield the power we do,
Though they'd certainly help if they could.

—by Mindy Bingham and Sandy Stryker

To the Cedar Tree

Look at me, friend!
I come to ask for your dress . . .

I come to beg you for this,
Long-life Maker,

For I am going to make a basket for
lily roots out of you.
I pray you, friend, not to feel angry

—Traditional Kwakiutl Verse



Session 3, Multiple-choice Questions

28. In the poem "It's Up to People," the word *wield* in line 3 means

- ✓ A. have and use.
- B. waste.
- C. want or need.
- D. discover.

Related Learning Standard for Item 28: **Learning Standard 8 (p. 17)**

29. In the poem "It's Up to People," a *jacaranda* is probably

- A. an animal.
- B. a place.
- C. a person.
- ✓ D. a tree.

Related Learning Standard for Item 29: **Learning Standard 8 (p. 17)**

30. How many syllables are in the word *photosynthesis*?

- A. 3
- B. 4
- ✓ C. 5
- D. 6

Related Learning Standard for Item 30: **Learning Standard 5 (p. 16)**

31. What is the MAIN theme of the poem "It's Up to People"?

- A. Some animals are losing their favorite trees.
- B. Trees are something of value to all of us.
- ✓ C. Only human beings can prevent trees from being cut down.
- D. We will lose animals as well as trees if we do not save trees.

Related Learning Standard for Item 31: **Learning Standard 14 (p. 17)**

32. In line 2 of the poem "To the Cedar Tree," what does the poet mean by the word *dress*?

- ✓ A. bark
- B. clothing
- C. shade
- D. roots

Related Learning Standard for Item 32: **Learning Standard 15 (p. 18)**

33. What is the speaker in "To the Cedar Tree" asking of the tree?

- A. health
- B. friendship
- C. happiness
- ✓ D. forgiveness

Related Learning Standard for Item 33: **Learning Standard 14 (p. 17)**

34. In "To the Cedar Tree," the person who wants to make the basket talks to the tree as if it were

- A. a tribal chieftain.
- ✓ B. a living thing with feelings.
- C. an angry animal.
- D. a little child.

Related Learning Standard for Item 34: **Learning Standard 14 (p. 17)**

35. What idea about trees is shown in both poems?

- A. Only people can save trees for animals.
- ✓ B. People should care about trees.
- C. Trees can be made into useful things.
- D. Animals do not have the power to save trees.

Related Learning Standard for Item 35: **Learning Standard 14 (p. 17)**

Session 3, Open-response Question

36. Using evidence from both poems, tell how the poets have similar feelings about trees.

Related Learning Standard for Item 36: **Learning Standard 11 (p. 17)**

Session 3, Reading Selection #2

Have you ever acted in a school play? The lines below are from a play about a beloved figure from American history. Read the scene to learn more about the man called Johnny Appleseed and then answer the questions that follow.

GOOD FRIEND, JOHNNY APPLESEED

by Kathryn Sanders Reider

(It is summer in central Ohio. The War of 1812 has begun. In the Strong family's pioneer kitchen, Mrs. Strong, her son Roger, and daughter Lisa are looking forward to Johnny Appleseed's return. As the scene opens, the chorus sings "A Lot of Apple Seeds," and action begins.)

ROGER—Mother, I wish Johnny Appleseed would come. I've taken care of the trees he planted, just as he showed me, and I want him to see them. He'll be pleased.

MRS. STRONG (*sewing on quilting pieces*)—Well, Roger, 1812 has been a hard year. With this war going on, there's no telling when he'll appear. We don't see him for months in normal times—and these are hardly normal times. With British soldiers threatening us and unfriendly Indians sometimes moving through this country, it may be months before he appears. Then again, he may come at any time. (*She shakes her head.*) He's a strange man—a good one—but with ideas strange in this time of war and danger. (*She folds sewing.*)

LISA—How is he strange? Tell us about him. Is his name really Johnny Appleseed?

ROGER—Of course not, Lisa. His name is John Chapman.

MRS. STRONG—Johnny Appleseed came from New England. He wanted to help pioneers going west. In New England, everyone had an apple tree in the yard.

ROGER—And Johnny Appleseed gathered discarded apple seeds from the cider presses in Pennsylvania, and came in a canoe down the Ohio River to central Ohio, planting seeds everywhere.

MRS. STRONG (*lays aside her sewing and goes to look out the door*)—Not everywhere, Roger. He chose just good, sunny, well-drained places. Most of the time he travels on foot.

ROGER—All over this country, Lisa—hundreds of miles.

LISA—Well, I'm glad I've saved apple cores for him like he asked. Now he can plant some more. *(Pause.)* Mother, does he know how to read?

MRS. STRONG—Oh, yes. He went to school in New England. He always carries a book with him. Sometimes he leaves pages of it for us to read. *(Goes to stir the kettle in the fireplace.)* How I would love to hear him read to the family again, before the fireplace. His voice—there was none like it!

ROGER—But why does he wear ragged clothes?

MRS. STRONG—His needs are few and his clothes suit his way of life in the woods. Once someone gave him new shoes, but he gave them to a pioneer going west who needed them more than he did—said he was used to going barefoot most of the time. But he eats so little it worries me—a few berries or nuts. He often sleeps out under a tree. He's truly a man of peace and nature.

LISA—Well, I'm going to sing my doll to sleep, then take her out to the hollow tree he showed me. He's going to bring a ribbon for her hair. *(Lisa, center stage, sings "Sleep Little Cornhusk Dolly," then exits.)*

MRS. STRONG—Roger, maybe you should go with her. Then you can bring in more wood. I don't like your father's being gone so long. Perhaps he won't get home before sundown. With the woods full of danger, he won't want to travel at night.

LISA *(returns holding a bright-colored ribbon)*—Mother! Johnny Appleseed has been here. He left this ribbon in the tree.

MRS. STRONG—Oh, surely not. You must have put it there and forgotten it.

ROGER—If only he would come! But don't worry, Mother. You know the Indians here are friendly and good friends of Johnny Appleseed. Sing us the song you made up about him. Then I'll get the wood.

MRS. STRONG—You're trying to comfort me. You're a good son, Roger. Since General Hull surrendered so shamelessly at Detroit, nothing is certain. But, I'll sing the song. *(She sings the song "Good Friend, Johnny Appleseed.")*

ROGER—The sun is going down fast. I'll get the wood in a hurry. *(He goes out. Lisa sets the table. Mrs. Strong dishes up food from the fireplace pot. Roger returns and places wood by the fireplace. As they sit down to eat, a whippoorwill call is heard offstage.)*

ROGER—It's Johnny Appleseed! Lisa was right. I'd know that call anywhere.

LISA—I told you he was nearby. He just had to be.

(Johnny Appleseed enters. He is wearing ragged, mismatched clothes and has long hair. He walks with dignity and gentleness. He is followed by Mr. Strong. Cries of welcome greet them.)

Session 3, Multiple-choice Questions

37. Roger wants Johnny Appleseed to come because he wants Johnny to

- A. bring the family news about the war.
- B. taste the apples from his trees.
- C. bring some seeds to plant some trees.
- ✓ D. see how well he's taken care of his trees.

Related Learning Standard for Item 37: **Learning Standard 9 (p. 17)**

38. What is the first clue in the play that Johnny Appleseed has arrived?

- A. the whippoorwill call
- ✓ B. the ribbon in the hollow tree
- C. the sound of his singing
- D. the cries of welcome

Related Learning Standard for Item 38: **Learning Standard 9 (p. 17)**

39. What is the purpose of the words in parentheses after a character speaks?

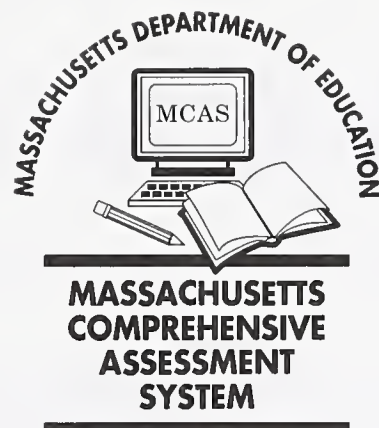
- A. to tell something new about the character
- ✓ B. to tell what the actor should do on stage
- C. to tell what the other actors are thinking
- D. to tell the audience what the lines mean

Related Learning Standard for Item 39: **Learning Standard 10 (p. 17)**

40. The prefix *un* makes the word *unfriendly* mean

- ✓ A. not friendly.
- B. very friendly.
- C. too friendly.
- D. falsely friendly.

Related Learning Standard for Item 40: **Learning Standard 5 (p. 16)**



III. English Language Arts, Grade 8

A. Composition

B. Language and Literature

Massachusetts Department of Education

Curriculum Framework *Learning Standards/* *MCAS Reporting Categories*

A. English Language Arts Composition *Grade 8*

The 1999 MCAS English Language Arts Composition (Writing) test was based on the learning standards of the *Composition* strand of the Massachusetts *English Language Arts Curriculum Framework*.¹⁰

ELA Composition test results are reported under the MCAS reporting category of *Composition*.

The learning standards for the *Composition* strand are listed below and are directly quoted from the *Framework*; applicable *Framework* page numbers are shown in parentheses. The ELA Composition writing prompt is based on all four of the *Composition* strand learning standards.

Composition (*Framework*, pp. 56–60)

Learning Standard 19

Students will write compositions with a clear focus, logically related ideas to develop it, and adequate detail.

Learning Standard 20

Students will select and use appropriate genres, modes of reasoning, and speaking styles when writing for different audiences and rhetorical purposes.

Learning Standard 21

Students will demonstrate improvement in organization, content, paragraph development, level of detail, style, tone, and word choice (diction) in their compositions after revising them.

Learning Standard 22

Students will use knowledge of standard English conventions to edit their writing.

¹⁰ Massachusetts Department of Education, *English Language Arts Curriculum Framework* (Malden, 1997).

MCAS Spring 1999 Common Test Items

A. English Language Arts Composition

Grade 8

Test Administration Sessions

MCAS Student Test Booklets included 2 separate ELA Composition test sessions, administered on the same day with a short break between sessions. During the first session, each student wrote a first draft of a composition in response to the following writing prompt. During the second session, each student revised his/her first draft and submitted his/her second draft for scoring.

Reference Materials and Tools

At least one dictionary per classroom was provided for student use during ELA Composition test sessions. No other reference materials or tools were allowed during either ELA Composition test session.

Grade 8 Writing Prompt

1. BACKGROUND FOR WRITING

Many parents and teachers feel that children should volunteer to help in their communities. They suggest that all students complete a certain number of hours of community service as part of their schooling. For example, students could provide childcare at a homeless shelter, pick up litter in a park, tutor younger students in reading or math, or help clean up a community center.

Imagine that the governor of Massachusetts is particularly interested in this idea and wants to make 75 hours of community service a requirement for graduation from public high school in your state. However, many people oppose this requirement because they feel that community-minded work should be done on a volunteer basis only.

The governor has invited students to write an essay expressing their feelings on the matter. By writing an essay, you can affect the outcome of this debate.

WRITING ASSIGNMENT

Write a persuasive essay telling whether you feel students should be required to complete 75 hours of community service as part of their graduation requirements. Give at least two reasons to support your position.

The way in which you present your argument could decide whether you will be required to do 75 hours of community service before you graduate from high school.

Related Learning Standards for Item 1: Learning Standards 19-22

Curriculum Framework *Learning Standards/* *MCAS Reporting Categories*

B. English Language Arts Language and Literature *Grade 8*

The 1999 MCAS English Language Arts Language and Literature (Reading) test was based on the learning standards of two content strands of the Massachusetts *English Language Arts Curriculum Framework*:¹¹

■ Language

■ Literature

These two *Framework* strands also serve as MCAS reporting categories for ELA Language and Literature test results.

The learning standards related to these two strands are listed below and are directly quoted from the *Framework*; applicable *Framework* page numbers are shown in parentheses. Each common item in the next section of this chapter is followed by a reference to the learning standard to which it is related.

Language (Framework, pp. 28–31)

Learning Standard 4

Students will acquire and use correctly an advanced reading vocabulary of English words, identifying meanings through an understanding of word relationships.

Learning Standard 5

Students will identify, describe, and apply knowledge of the structure of the English language and standard English conventions for sentence structure, usage, punctuation, capitalization, and spelling.

¹¹ See note 10.

Learning Standard 6

Students will describe and analyze how oral dialects differ from each other in English, how they differ from written standard English, and what role standard American English plays in informal and formal communication.

Learning Standard 7

Students will describe and analyze how the English language has developed and been influenced by other languages.

Literature (Framework, pp. 38–50)

Learning Standard 8

Students will decode accurately and understand new words encountered in their reading materials, drawing on a variety of strategies as needed, and then use these words accurately in . . . writing.

Learning Standard 9

Students will identify the basic facts and essential ideas in what they have read, heard, or viewed.

Learning Standard 10

Students will identify, analyze, and apply knowledge of the characteristics of different genres.

Learning Standard 11

Students will identify, analyze, and apply knowledge of theme in literature and provide evidence from the text to support their understanding.

Learning Standard 12

Students will identify, analyze, and apply knowledge of the structure and elements of fiction and provide evidence from the text to support their understanding.

Learning Standard 13

Students will identify, analyze, and apply knowledge of the structure, elements, and meaning of nonfiction or informational material and provide evidence from the text to support their understanding.

Learning Standard 14

Students will identify, analyze, and apply knowledge of the structure, elements, and theme of poetry and provide evidence from the text to support their understanding.

Learning Standard 15

Students will identify and analyze how an author's choice of words appeals to the senses, creates imagery, suggests mood, and sets tone.

Learning Standard 16

Students will compare and contrast similar myths and narratives from different cultures and geographic regions.

Learning Standard 17

Students will interpret the meaning of literary works, nonfiction, films, and media by using different critical lenses and analytic techniques.

MCAS Spring 1999 Common Test Items

B. English Language Arts Language and Literature Grade 8

Test Administration Sessions

MCAS Student Test Booklets included 3 separate ELA Language and Literature test sessions. Each session included selected readings, followed by multiple-choice and open-response questions.

Reference Materials and Tools

No reference materials or tools were allowed during any ELA Language and Literature test session.

Session 1, Reading Selection #1

Meg Gleason is the narrator's first friend in America. Read "The All-American Slurp" to find out how a typical American meal appears to the narrator's Chinese family. Answer the questions that follow.

The All-American Slurp

Lensey Namioka

Students read a passage titled "The All-American Slurp"
and then answered questions 2 through 5.

Due to copyright restrictions, the passage cannot be released to the public
in this document.

Reading Passage:

"The All-American Slurp" by Lensey Namioka from *Visions*,
edited by Donald R. Gallo. Copyright © 1987.

Session 1, Multiple-choice Questions

2. Why did the members of the Lin family each take a piece of celery?

- ✓ A. They wanted to be polite.
- B. They thought it looked delicious.
- C. They wanted to try new American foods.
- D. They were afraid of disgracing the Gleasons.

Related Learning Standard for Item 2: **Learning Standard 9 (p. 49)**

3. In paragraph 17, what does the imagery suggest?

- A. that the Lins no longer felt the Gleasons were their friends
- B. that the Lins were amazed by all the food on the table
- C. that Mrs. Gleason had been thoughtless to the Lins
- ✓ D. that the Lins were embarrassed by their misunderstanding

Related Learning Standard for Item 3: **Learning Standard 15 (p. 50)**

4. “The All-American Slurp” might best be included in a collection of stories about

- A. new friendships.
- B. the Chinese people.
- ✓ C. new immigrants to America.
- D. the American people.

Related Learning Standard for Item 4: **Learning Standard 12 (p. 49)**

5. “The Gleasons’ dinner party wasn’t so different from a Chinese meal after all.” The language the author uses can best be described as

- ✓ A. Standard English.
- B. informal jargon.
- C. Chinese dialect.
- D. non-Standard English.

Related Learning Standard for Item 5: **Learning Standard 6 (p. 49)**

Session 1, Reading Selection #2

Sixteen-year-old Evie Hutchins, the main character in A String of Chances, lives with her parents and Aunt Ida in a small Maryland town. To make ends meet, the family takes in elderly boarders in need of care. Read this chapter from the novel and answer the questions that follow.

A String of Chances

by Phyllis Reynolds Naylor

"Help."

A strangely calm but insistent voice came from one of the lower bedrooms. Like the ring of a telephone, it was repeated again and again at regular intervals.

"Evie, can you tend to Sister Ozzie?" Aunt Ida called. "I've got my hands in the bread dough. Soon as the cartoons is over, she starts that yelling."

Evie went downstairs and into the bedroom in back of the kitchen. A tall, angular woman in a short nightdress was sitting on the edge of the bed, rocking back and forth. Her wrinkled cheeks were heavily rouged, and a jagged line of lipstick cut across her mouth. Like a veil, her white hair hung in wisps about her face and shoulders.

"I want to see Mama," said Sister Ozzie.

"Your mama's not here, but I am. What would you like?"

"I want to go to the bathroom."

"Are you sure?"

"I want to put on my make-up."

It was attention she wanted, then. *An old fool's vanity*, Aunt Ida had said about the cosmetics. *She never wore any all the years she sang in the choir, and why she wants it now that her mind's gone, I don't know.*

Evie took a box from the night stand and handed Ozzie a mirror. The old woman stared intently at her own reflection.

"Who's that?" she asked sharply.

"It's you, Sister Ozzie."

The tall woman frowned.

"Now what you need," Evie told her, "is something to highlight your eyes. Hold real still."

The white-haired lady began to smile. Carefully Evie rubbed a sponge-tipped stick in the blue mascara and smeared it under Sister Ozzie's eyebrows. Even there, the skin was finely wrinkled, like crepe.

"You're going to be so beautiful that men will go absolutely mad," Evie told her. "They'll be pounding on the door day and night."

Sister Ozzie giggled, then scolded, "Well, go on. You always stop."

"The first man will say, 'Sister Ozzie,'" and Evie lowered her voice, "'I've brung you these here flowers to put on your table.' And you will lift one long finger, and the butler will throw him out. Close your eyes, now."

"What butler?"

"Murphy."

"Oh."

"Then the second man will knock on your door, and he'll say, 'Sister Ozzie, I've brought you some flowers to wear on your dress.'"

The old woman's eyelids fluttered. "And I'll take them, won't I?"

"Nope." Evie smoothed out the spots of rouge that Sister Ozzie had applied herself that morning. "You'll just smile

and say, 'No, thank you,' and Murphy will show him out. Because you're waiting for the third man, see. Then *he'll* knock and say, 'Ah, Mademoiselle, here are the most beautiful flowers in all the world to wear in your beautiful hair.'"

"I'll take them!" Sister Ozzie cried.

"Of course, you will, and he'll pin them behind your ear, whispering adoringly . . ."

"Evelyn Hutchins, that is about the silliest thing I ever heard," said a voice from

the doorway, but Aunt Ida chuckled as she passed by.

Sister Ozzie put one wrinkled hand over Evie's and said, "I certainly do like your stories." And for one brief moment it seemed that the old woman had a grasp on time and place before she let them slip away once more. Would she even remember her, Evie wondered, come September?

Session 1, Multiple-choice Questions

6. Why does Evie think Sister Ozzie started wearing cosmetics only after she became bedridden?
- A. She wanted to look young again.
 - ✓ B. She wanted someone to pay attention to her.
 - C. She turned into a completely different person.
 - D. She wanted to look beautiful again.

Related Learning Standard for Item 6: **Learning Standard 9 (p. 49)**

7. The story Evie tells Sister Ozzie about the three callers with flowers shows that Evie
- A. admires Sister Ozzie.
 - ✓ B. has a good imagination.
 - C. values material possessions.
 - D. has an appreciation of flowers.

Related Learning Standard for Item 7: **Learning Standard 12 (p. 49)**

8. What quality of Evie's is evident in the way she treats Sister Ozzie?
- ✓ A. patience
 - B. meekness
 - C. efficiency
 - D. aggressiveness

Related Learning Standard for Item 8: **Learning Standard 12 (p. 49)**

9. In the last paragraph, the author says, "... it seemed that the old woman had a grasp on time and place before she let them slip away once more." This phrase **most likely** means that Sister Ozzie
- A. was thinking about her past.
 - B. did not want to forget Evie.
 - C. did not have long to live.
 - ✓ D. was thinking clearly for a moment.

Related Learning Standard for Item 9: **Learning Standard 15 (p. 50)**

Session 1, Open-response Question

10. How do the ways in which Evie treats Sister Ozzie demonstrate that she is a good caregiver?
Use examples from the chapter to support your answer.

Related Learning Standard for Item 10: **Learning Standard 12** (p. 49)

Session 1, Reading Selection #3

Read this essay that eulogizes Arthur Ashe, the tennis champion who died in 1994.
Answer the questions that follow.

Arthur Ashe Remembered

by John McPhee

(Originally published in *The New Yorker*, March 1993.)

1 He once described his life as a “succession of fortunate circumstances.” He was in his twenties then. More than half of his life was behind him. His memory of his mother was confined to a single image: in a blue corduroy bathrobe she stood in a doorway looking out on the courts and playing fields surrounding their house, which stood in the center of a Richmond playground. Weakened by illness, she was taken to a hospital that day, and died at the age of twenty-seven. He was six.

2 It was to be his tragedy, as the world knows, that he would leave his own child when she was six, that his life would be trapped in a medical irony as a result of early heart disease, and death would come to him prematurely, as it had to his mother.

3 His mother was tall, with long soft hair and a face that was gentle and thin. She read a lot. She read a lot to him. His father said of her, “She was just like Arthur Junior. She never argued. She was quiet, easygoing, kindhearted.”

4 If by legacy her son never argued, he was also schooled, instructed, coached not to argue, and as he moved alone into alien country he fashioned not-arguing into an enigma and turned the enigma into a weapon. When things got tough (as I noted in these pages twenty-four years ago), he had control. Even in very tight moments, other players thought he was toying with them. They rarely knew what he was thinking. They could not tell if he was angry. It was maddening, sometimes, to play against him. Never less than candid, he said that what he liked best about himself on a tennis court was his demeanor: “What it is is controlled cool, in a way. Always have the situation under control, even if losing. Never betray an inward sense of defeat.”

5 And of course he never did—not in the height of his athletic power, not in the statesmanship of the years that followed, and not in the endgame of his existence. If you wished to choose a single image, you would see him standing there in his twenties, his lithe body a braid of cables, his energy without apparent limit, in a court situation indescribably bad, and all he does is put his index finger on the bridge of his glasses and push them back up the

bridge of his nose. In the shadow of disaster, he hits out. Faced with a choice between a conservative, percentage return or a one- in-ten flat-out blast, he chooses the blast. In a signature manner, he extends his left arm to point upward at lobs as they fall toward him. His overheads, in fire bursts, put them away. His backhand is, if anything, stronger than his forehand, and his shots from either side for the most part are explosions. In motions graceful and decisive, though, and with reactions as fast as the imagination, he is a master of drop shots, of cat-and-mouse, of miscellaneous dinks and chips and (riskiest of all) the crosscourt half-volley. Other tennis players might be wondering who in his right mind would attempt something like that, but that is how Ashe plays the game: at the tensest moment, he goes for the all but impossible. He is predictably unpredictable. He is unreadable. His ballistic serves move in odd patterns and come off the court in unexpected ways. Behind his impassive face—behind the enigmatic glasses, the lifted chin, the first-mate-on-the-bridge look—there seems to be, even from this distance, a smile.

Session 1, Multiple-choice Questions

Use the dictionary entry below to answer question 11.

de•scribe (di-skrīb') *vt.* -scribed', -scrib'ing
 [ME. *descriven* < OFr. *descrivre* < L. *describere*, to copy down, transcribe < *de-*, from + *scribere*, to write: SEE SCRIBE]
 1. to tell or write about; give a detailed account of 2. to picture in words 3. to trace the outline of [his arm *described* an arc in the air]

11. What is the origin of the word *describe*?

- A. Greek
- B. German
- C. Flemish
- ✓ D. Latin

Related Learning Standard for Item 11: **Learning Standard 7 (p. 49)**

12. In paragraph 2, the author says that “death would come to him prematurely, as it had to his mother.” What does *prematurely* mean?

- A. painfully evident
- ✓ B. earlier than expected
- C. suddenly and unexpectedly
- D. peacefully

Related Learning Standard for Item 12: **Learning Standard 8 (p. 49)**

13. In paragraph 4, Arthur Ashe said “what he liked best about himself on a tennis court was his demeanor.” What does *demeanor* mean?

- A. drive to win
- B. playing skills
- ✓ C. conduct
- D. gracefulness

Related Learning Standard for Item 13: **Learning Standard 8 (p. 49)**

14. The author uses paragraph 4 to describe

- ✓ A. Ashe’s self-control.
- B. how Ashe learned to play tennis.
- C. the influence Ashe’s father had on him.
- D. how Ashe felt about tennis.

Related Learning Standard for Item 14: **Learning Standard 13 (p. 49)**

15. In paragraph 5, the phrase “a braid of cables” describes Arthur Ashe’s

- A. very long legs.
- ✓ B. muscular body.
- C. tennis racquet.
- D. high energy.

Related Learning Standard for Item 15: **Learning Standard 15 (p. 50)**

16. In paragraph 5, the author focuses on Arthur Ashe's

- A. private life off the court.
- B. physical appearance.
- ✓ C. skills that made him a winning tennis player.
- D. experiences that shaped the way he played.

Related Learning Standard for Item 16: **Learning Standard 9 (p. 49)**

17. The author's **main** purpose in writing this essay was to

- A. warn the reader about the dangers of playing tennis.
- B. persuade the reader to start playing tennis at an early age.
- C. entertain the reader with an amusing story about a tennis player.
- ✓ D. inform the reader about the qualities of a great tennis player.

Related Learning Standard for Item 17: **Learning Standard 9 (p. 49)**

18. This essay can best be described as *biographical* because it tells about

- A. one person.
- ✓ B. an actual person's life.
- C. events that really happened.
- D. something from the past.

Related Learning Standard for Item 18: **Learning Standard 10 (p. 49)**

Session 1, Open-response Question

19. Based on what you have read, which **two** qualities do you think the author most admired about Arthur Ashe? Use information from the essay to support your answer.

Related Learning Standard for Item 19: **Learning Standard 12** (p. 49)

Session 2, Reading Selection #1

Read "Orpheus and Eurydice" and look for clues that tell how the ancient Greeks seemed to view life and death. Answer the questions that follow.

Orpheus and Eurydice

In the kingdom of Thrace there lived a poet and sweet singer, Orpheus by name. His father, who was Apollo, had given him a lyre and taught him to play it. So it is no wonder that the young man's music charmed everyone. So enchanting was it, indeed, that when Orpheus plucked the strings, wild beasts gathered round him and grew tame. He drew the very trees after him. The rocks on the hillsides moved to his music, and the rivers changed their courses that they might hear him.

Many maidens loved Orpheus, yet he loved one alone—Eurydice. And one day they were married. But while the young bride wandered with her bridesmaids in a meadow, a serpent bit her ankle and she fell lifeless to the ground.

Who can describe the grief of Orpheus then? Day and night he wept for his lost wife. But tears brought no ease to his spirit. His heart grew heavier instead of lighter, and at last he determined to do what no other mortal man had dared do for his love before. He would descend to the underworld and beg Pluto to restore Eurydice.

Now Orpheus knew where a deep cavern led far into the earth, and by means of it he got down to the River Styx.

"Take me across!" Orpheus said to Pluto's ferryman.

"No," Charon answered, "my bark is made for the shades of the dead. You are too heavy. I dare not take you."

But when Orpheus struck his lyre, the ferryman yielded. Cerberus, the three-headed dog who guarded the entrance to Pluto's realm, would not let him by. But he yielded too when Orpheus played his lyre. So the poet entered the realm of the dead, passed among the shades, and came to the throne of Pluto and Persephone.

He bowed low before the King and Queen. Then he plucked the strings of his lyre, and accompanying his words with tenderest music, began to sing:

"O Lords of the Underworld! I do not come here to spy out the secrets of your realm. I come to seek my wife, cut off in her bloom when she trod on a serpent and it poured its poison in her veins. I have tried to endure my grief, but I cannot—Love is too much for me. Love led me here—Love, a god well known to us who dwell on earth. And here, too, he is familiar if the story of yourselves is true.

"For you, too, O King and Queen, were brought together by Love. I implore you, by these haunts of terror, by these realms of silence, make whole again the thread of Eurydice's life. All of us mortals must descend to you at last. For this is our final home, and yours is the most lasting sway over mankind. My wife, like all the rest, will come within your power in time. But until then, I implore you, grant her to me. If you refuse, keep me here, too. I do not wish to return alone. Triumph in my death as well as hers."

He sang, and as the sweet music and moving words swept through the dismal halls, the bloodless shades shed tears. The very instruments of punishment ceased from inflicting pain, and all the doomed

11 rested from their weary tasks. Then for the first time the cheeks of the pitiless Furies were wet with tears. Wet, too, were the eyes of Persephone. And even Pluto softened, as on that day when Eros shot the arrow into his heart. Iron tears rolled down his cheeks.

12 “Let Eurydice be called!” he said.

“Eurydice! Eurydice!” sounded through the silent halls of death. And out of the depths where all the newly-arrived shades flocked together, pale Eurydice came,

13 walking slowly because of her injured foot. She stood sadly before the throne, not knowing why she was being summoned. And then she saw Orpheus and her shadowy face lit up with such joy as those regions had never beheld.

“Take her,” Pluto said. “But remember!”

14 Do not look back until you have reached the

upper air. For if you do, Eurydice will die again.”

15 Through gloom and heavy silence Orpheus passed first up the steep, dark, narrow, sloping path, and Eurydice came limping behind. Joy filled the poet’s heart. His daring had succeeded. His music had made the grim god grant what love demanded. If only Eurydice’s strength would not fail her till they reached the surface!

16 Near the top it suddenly seemed to Orpheus that he could not longer hear Eurydice’s step behind him. Seized with panic, he turned to see if she was there. And at once Eurydice slipped back into the depths.

17 “Come to me, my love, come back!” Orpheus cried, stretching out his arms. “Do not die a second time and leave me desolate!”

18 But no answer came from the gloom. For a long time Orpheus stood staring into nothingness, then, turning, he went his heavy upward way.

Session 2, Multiple-choice Questions

20. Reread paragraphs 4, 5, and 6. What does Charon's *bark* refer to in paragraph 6?

- A. a dog
- B. a tree
- C. a song
- ✓ D. a boat

Related Learning Standard for Item 20: **Learning Standard 8 (p. 49)**

21. Orpheus says, "I implore you, by those haunts of terror, by these realms of silence, make whole again the thread of Eurydice's life." The language Orpheus uses can **best** be described as

- ✓ A. formal English.
- B. technical.
- C. jargon.
- D. non-Standard English.

Related Learning Standard for Item 21: **Learning Standard 6 (p. 49)**

22. In paragraph 10, the phrase "the most lasting sway over mankind" refers to the

- A. power of love.
- ✓ B. permanence of death.
- C. fullest understanding.
- D. gentlest mercy.

Related Learning Standard for Item 22: **Learning Standard 12 (p. 49)**

23. "He sang, and as the sweet music and moving words swept through the dismal halls, the bloodless shades shed tears."

What part of speech is *moving* in the sentence above?

- ✓ A. adjective
- B. noun
- C. verb
- D. adverb

Related Learning Standard for Item 23: **Learning Standard 5 (p. 48)**

24. What did Orpheus do to persuade the King and Queen of the Underworld to grant his request?

- ✓ A. He played his lyre and pleaded with them in song.
- B. He offered his life in exchange for Eurydice's life.
- C. He told them how beautiful Eurydice was in life.
- D. He pretended to have powers like those of Apollo.

Related Learning Standard for Item 24: **Learning Standard 9 (p. 49)**

25. Why did Eurydice return to the underworld?

- A. She loved Pluto and wanted to return to him.
- B. She was not strong enough to follow Orpheus.
- C. Orpheus tripped and caused her to slip back.
- ✓ D. Orpheus turned to see if she was behind him.

Related Learning Standard for Item 25: **Learning Standard 9 (p. 49)**

26. The primary setting for most of this story is

- A. the kingdom of Thrace.
- B. the river Styx.
- ✓ C. the underworld.
- D. a dark forest.

Related Learning Standard for Item 26: **Learning Standard 12 (p. 49)**

27. This story is an example of a

- A. fairy tale.
- B. fable.
- ✓ C. myth.
- D. folktale.

Related Learning Standard for Item 27: **Learning Standard 10 (p. 49)**

Session 2, Open-response Question

28. Describe the underworld as presented in this story in your own words. Explain how the setting of the underworld contributes to the mood or tone of the story. Use examples from the story to support your answer.

Related Learning Standard for Item 28: **Learning Standard 12 (p. 49)**

Session 3, Reading Selection #1

Have you ever thought about how an island is formed? Read the article entitled "An Island Is Born" and answer the questions that follow.

An Island Is Born

1 On November 10, 1963, the citizens of Heimay, a town in the Westman Islands off the south coast of Iceland, noticed a foul stench in the air. The offensive odor had the smell of rotting sulfur. The people recognized it as such and complained to one another, but no one could identify the source.

2 Three days later the captain of a trawler fishing near the Westman Islands ordered a deck hand to test the temperature of the ocean water. It should have been 44.6 degrees Fahrenheit. But instead the thermometer read 48.9 degrees. This temperature was unusually high, and the captain became suspicious. He ordered his men to run a second check on the temperature. By the time the second measurement was taken, however, the trawler had sailed some distance from the original site. The second reading registered a normal 44.6 degrees.

3 The next morning the fishing vessel *Isleifur II* sailed into the area. It was early in the morning, and the cook was the only one standing watch on the deck. The captain and the rest of the crew were still in their cabins. Suddenly the ship began to roll and twist as if caught in a whirlpool. Alarmed, the cook ran to tell Captain Gudman Tomasson. Before he had gone far, however, he stopped short and stared out at the ocean. Less than a mile away was a thick column of smoke rising from the sea.

Was it a ship on fire? The frenzied cook hurried off to rouse the captain.

4 Captain Tomasson rushed up to the deck and gazed through his binoculars at the dark billowing smoke. Immediately he called the Coast Guard on the ship-to-shore radio. Had there been any reports of a ship in trouble? The Coast Guard answered in the negative; no SOS had been called in.

5 Tomasson then ordered his ship to sail closer to the smoke. He thought he knew what was going on, but he wanted to be sure. When the *Isleifur II* was about a half mile from the ever-blackening smoke, Tomasson could see the sea water boiling. Several plumes of smoke could now be distinguished, rising from the ocean's surface. Now he knew he was right; now he knew exactly what was happening.

6 Tomasson ordered his boat to change direction. He wanted to view the phenomenon, but from a safer distance. He didn't want to be too close to the underwater volcano that was rising like some giant sea monster from the ocean depths.

7 The captain was not shocked by the appearance of an underwater volcano. Volcanoes are nothing new to Iceland. Turbulent eruptions have always been part of the scene in that corner of the world. In fact, one of the world's most active zones of volcanic activity cuts right across Iceland. That island nation is part of a largely

submarine ridge that runs ten thousand miles from one end of the Atlantic to the other. Along the entire length of the ridge, earthquakes and volcanoes are quite common.

- 8 In 1793, for example, the largest flow of volcanic lava ever seen on earth was generated in Iceland. There appeared enough of this red-hot liquid rock to have covered the entire state of Vermont to a depth of two feet. A blue haze, caused by clouds of ash in the upper atmosphere, covered Iceland. Sulfur polluted the air, causing plant life to wither. With their food source destroyed, cattle died and littered the land. As a result of this devastation, one-fifth of the people in Iceland starved to death. Since that time, Iceland has averaged one volcanic blast every five years. Mt. Hekla, one of Iceland's active volcanoes, has been known for centuries as the "gateway to hell."

- 9 Captain Tomasson knew all of this, so he knew what might happen with the angry inferno that was churning beneath the water. Within a few hours, the column of smoke was reaching two and a half miles above the sea. Tomasson's crew was spellbound by the sight. As the day progressed, the developing volcano grew more and more dramatic. The sound of eruptions under the sea was muted, but the emerging smoke told the tale of a volcano struggling to reach the surface.

- 10 All day long the volcano continued to build its base. The sea was 435 feet deep where the volcano had started. After the sun had set, the lava had reached the sea's surface. As the hot lava met the cold sea water, it hardened, forming a foundation for the island.

- 11 For several weeks the island, which was given the name Surtsey (SERT-say), after the god of fire, continued to grow. At first, fiery tongues of lava flowed out from the main crater. This added continually to the bulk of the new island. On some days the smoke could be seen in Reykjavík, the capital of Iceland, seventy-five miles away. Ash, cinders and lava spewed out, caused by explosions that sometimes took place just seconds apart. The infant volcano sent over 400,000 tons of matter into the air every hour. Boats carrying sightseers were showered with hailstones and light rocks called pumice.

- 12 The youthful volcano was battling for its life against the force of the sea. Other such islands have often appeared only to disappear again, beaten down by the sea. Surtsey needed to produce enough lava to cover itself with a hard protective shell. By the end of 1963, Surtsey was nearly five hundred feet high and more than half a mile wide. In time it would grow to more than one square mile. It was soon clear that the island would be a permanent fixture in the Westman Islands. Surtsey would not be washed away.

Session 3, Multiple-choice Questions

Use the dictionary entry below to answer question 29.

foul (fow · el) 1. a collision, esp. in sailing
2. to commit a violation of the rules in a game
3. offensive to the senses
4. clogged with a foreign substance

29. Which definition most closely matches the meaning of *foul* as it is used in paragraph 1?

- A. definition 1
- B. definition 2
- ✓ C. definition 3
- D. definition 4

Related Learning Standard for Item 29: **Learning Standard 4 (p. 48)**

30. In paragraph 2, the author says, “the captain of a trawler fishing near the Westman Islands ordered a deck hand to test the temperature of the ocean water.” What does *trawler* mean?

- A. crew
- B. submarine
- C. Coast Guard
- ✓ D. boat

Related Learning Standard for Item 30: **Learning Standard 8 (p. 49)**

31. “It was early in the morning, and the cook was the only one standing watch on the deck.”

The sentence above is a

- A. simple sentence.
- ✓ B. compound sentence.
- C. complex sentence.
- D. compound-complex sentence.

Related Learning Standard for Item 31: **Learning Standard 5 (p. 48)**

32. In which sentence does the author use sensory imagery to get his idea across?

- ✓ A. "Suddenly the ship began to roll and twist as if caught in a whirlpool."
- B. "A new land mass was being formed."
- C. "Tomasson then ordered his ship to sail closer to the smoke."
- D. "The captain and the rest of the crew were still in their cabins."

Related Learning Standard for Item 32: **Learning Standard 15 (p. 50)**

33. In paragraph 7, the author states, "That island nation is part of a largely submarine ridge that runs ten thousand miles from one end of the Atlantic to the other." What does the word *submarine* mean in this sentence?

- A. long and narrow, like an underwater ship
- B. a route that underwater boats follow across the Atlantic
- ✓ C. entirely beneath the surface of the water
- D. a ship that travels while submerged

Related Learning Standard for Item 33: **Learning Standard 8 (p. 49)**

34. In the 1790s, plant life in Iceland withered and died because of

- A. flooding from melting ice.
- B. heat from a volcano.
- C. a flow of lava.
- ✓ D. gases from a volcano.

Related Learning Standard for Item 34: **Learning Standard 9 (p. 49)**

35. The base of the island was formed when

- A. seawater boiled to the surface.
- ✓ B. the cold ocean water hardened the lava.
- C. a ridge of red-hot liquid rock developed.
- D. ash from the volcano settled on the sea floor.

Related Learning Standard for Item 35: **Learning Standard 9 (p. 49)**

36. The sentence, "The youthful volcano was battling for its life against the force of the sea" means

- A. youth is often no assurance of survival.
- B. the island was surrounded by water that smelled.
- ✓ C. it was not at all certain the island would survive.
- D. people were hoping the island would continue to grow.

Related Learning Standard for Item 36: **Learning Standard 15 (p. 50)**

Session 3, Open-response Question

37. The author describes the volcano as “rising like some giant sea monster from the ocean depths.” Describe **three** ways an underwater volcano is like a sea monster. Use information from the article to support your answer.

Related Learning Standard for Item 37: **Learning Standard 13** (p. 49)

Session 3, Reading Selection #2

The poems “Snow Toward Evening” and “Wind and Silver” both describe a moment in time. Read these two poems and answer the questions that follow.

Snow Toward Evening

- Suddenly the sky turned gray,
The day,
Which had been bitter and chill,
Grew intensely soft and still.
- 5** Quietly
From some invisible blossoming tree
Millions of petals cool and white
Drifted and blew,
Lifted and flew,
- 10** Fell with the falling night.

—Melville Cane

Wind and Silver

Greatly shining,
The Autumn moon floats in the thin sky;
And the fish-ponds shake their backs and flash their dragon scales
As she passes over them.

—Amy Lowell

Session 3, Multiple-choice Questions

Use the definitions below to answer question 38.

chill 1. shivering 2. distant
3. cold 4. depressing

38. Which definition **most** closely matches the meaning of *chill* as it is used in the third line of "Snow Toward Evening"?

- A. definition 1
- B. definition 2
- ✓ C. definition 3
- D. definition 4

Related Learning Standard for Item 38: **Learning Standard 4 (p. 48)**

39. In "Snow Toward Evening" the image of millions of petals represents the

- A. promise of a new day.
- ✓ B. wonder and beauty of falling snow.
- C. bright and puffy clouds overhead.
- D. gentle wind caressing the blossoming tree.

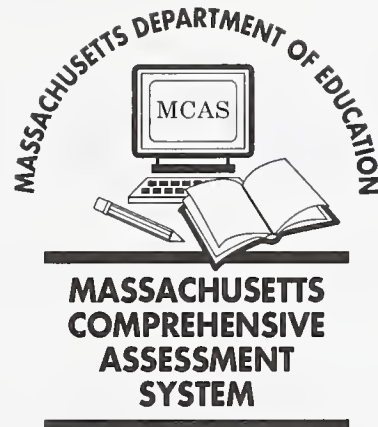
Related Learning Standard for Item 39: **Learning Standard 14 (p. 49)**

40. These two poems are classified as *poetry* rather than prose because they
- A. contain rhyming words.
 - B. tell about the writer's feelings.
 - C. contain descriptive phrases.
 - ✓ D. are written in verse form.

Related Learning Standard for Item 40: **Learning Standard 10 (p. 49)**

41. In the poem "Wind and Silver," the word *she* in the last line means the
- A. dragon.
 - B. wind.
 - ✓ C. Moon.
 - D. silvery cloud.

Related Learning Standard for Item 41: **Learning Standard 14 (p. 49)**



IV. English Language Arts, Grade 10

A. Composition

B. Language and Literature

Massachusetts Department of Education

Curriculum Framework *Learning Standards/* *MCAS Reporting Categories*

A. English Language Arts Composition *Grade 10*

The 1999 MCAS English Language Arts Composition (Writing) test was based on the learning standards of the *Composition* strand of the Massachusetts *English Language Arts Curriculum Framework*.¹²

ELA Composition test results are reported under the MCAS reporting category of *Composition*.

The learning standards for the *Composition* strand are listed below and are directly quoted from the *Framework*; applicable *Framework* page numbers are shown in parentheses. The ELA Composition writing prompt is based on all four of the *Composition* strand learning standards.

Composition (*Framework*, pp. 56–60)

Learning Standard 19

Students will write compositions with a clear focus, logically related ideas to develop it, and adequate detail.

Learning Standard 20

Students will select and use appropriate genres, modes of reasoning, and speaking styles when writing for different audiences and rhetorical purposes.

Learning Standard 21

Students will demonstrate improvement in organization, content, paragraph development, level of detail, style, tone, and word choice (diction) in their compositions after revising them.

Learning Standard 22

Students will use knowledge of standard English conventions to edit their writing.

¹² Massachusetts Department of Education, *English Language Arts Curriculum Framework* (Malden, 1997).

MCAS Spring 1999 Common Test Items

A. English Language Arts Composition

Grade 10

Test Administration Sessions

MCAS Student Test Booklets included 2 separate ELA Composition test sessions, administered on the same day with a short break between sessions. During the first session, each student wrote a first draft of a composition in response to the following writing prompt. During the second session, each student revised his/her first draft and submitted his/her second draft for scoring.

Reference Materials and Tools

At least one dictionary per classroom was provided for student use during ELA Composition test sessions. No other reference materials or tools were allowed during either ELA Composition test session.

Grade 10 Writing Prompt

1. WRITING ASSIGNMENT

In literature, as in life, things are not always as they appear to be. Identify a work of literature that you have read in or out of class in which this is true. Select one event, scene, or episode from this work of literature and explain in an essay what the situation appears to be and what the situation really is.

Related Learning Standards for Item 1: **Learning Standards 19-22**

Curriculum Framework *Learning Standards/* *MCAS Reporting Categories*

B. English Language Arts Language and Literature *Grade 10*

The 1999 MCAS English Language Arts Language and Literature (Reading) test was based on the learning standards of two content strands of the Massachusetts *English Language Arts Curriculum Framework*:¹³

■ Language

■ Literature

These two *Framework* strands also serve as MCAS reporting categories for ELA Language and Literature test results.

The learning standards related to these two strands are listed below and are directly quoted from the *Framework*; applicable *Framework* page numbers are shown in parentheses. Each common item in the next section of this chapter is followed by a reference to the learning standard to which it is related.

Language (Framework, pp. 28–31)

Learning Standard 4

Students will acquire and use correctly an advanced reading vocabulary of English words, identifying meanings through an understanding of word relationships.

Learning Standard 5

Students will identify, describe, and apply knowledge of the structure of the English language and standard English conventions for sentence structure, usage, punctuation, capitalization, and spelling.

¹³ See note 12.

Learning Standard 6

Students will describe and analyze how oral dialects differ from each other in English, how they differ from written standard English, and what role standard American English plays in informal and formal communication.

Learning Standard 7

Students will describe and analyze how the English language has developed and been influenced by other languages.

Literature (Framework, pp. 38–50)

Learning Standard 8

Students will decode accurately and understand new words encountered in their reading materials, drawing on a variety of strategies as needed, and then use these words accurately in . . . writing.

Learning Standard 9

Students will identify the basic facts and essential ideas in what they have read, heard, or viewed.

Learning Standard 10

Students will identify, analyze, and apply knowledge of the characteristics of different genres.

Learning Standard 11

Students will identify, analyze, and apply knowledge of theme in literature and provide evidence from the text to support their understanding.

Learning Standard 12

Students will identify, analyze, and apply knowledge of the structure and elements of fiction and provide evidence from the text to support their understanding.

Learning Standard 13

Students will identify, analyze, and apply knowledge of the structure, elements, and meaning of nonfiction or informational material and provide evidence from the text to support their understanding.

Learning Standard 14

Students will identify, analyze, and apply knowledge of the structure, elements, and theme of poetry and provide evidence from the text to support their understanding.

Learning Standard 15

Students will identify and analyze how an author's choice of words appeals to the senses, creates imagery, suggests mood, and sets tone.

Learning Standard 16

Students will compare and contrast similar myths and narratives from different cultures and geographic regions.

Learning Standard 17

Students will interpret the meaning of literary works, nonfiction, films, and media by using different critical lenses and analytic techniques.

MCAS Spring 1999 Common Test Items

B. English Language Arts Language and Literature Grade 10

Test Administration Sessions

MCAS Student Test Booklets included 3 separate ELA Language and Literature test sessions. Each session included selected readings, followed by multiple-choice and open-response questions.

Reference Materials and Tools

No reference materials or tools were allowed during any ELA Language and Literature test session.

Session 1, Reading Selection #1

The following selection is a chapter from The House on Mango Street by Sandra Cisneros. As you read the chapter, think about how the author develops the character of Sally. When you have finished reading, answer the questions that follow.

Sally

by Sandra Cisneros

1 Sally is the girl with eyes like Egypt and nylons the color of smoke. The boys at school think she's beautiful because her hair is shiny black like raven feathers and when she laughs, she flicks her hair back like a satin shawl over her shoulders and laughs.

2 Her father says to be this beautiful is trouble. They are very strict in his religion. They are not supposed to dance. He remembers his sisters and is sad. Then she can't go out. Sally I mean.

3 Sally, who taught you to paint your eyes like Cleopatra? And if I roll the little brush with my tongue and chew it to a point and dip it in the muddy cake, the one in the little red box, will you teach me?

4 I like your black coat and those shoes you wear, where did you get them? My mother says to wear black so young is dangerous, but I want to buy shoes just like yours, like your black ones made out of suede, just like those. And one day, when my mother's in a good mood, maybe after my next birthday, I'm going to ask to buy the nylons too.

5 Cheryl, who is not your friend anymore, not since last Tuesday before Easter, not since the day you made her ear bleed, not since she called you that name and bit a hole in your arm and you looked as if you were going to cry and everyone was waiting and you didn't, you didn't. Sally, not since then, you don't have a best friend to lean against the schoolyard fence with, to laugh behind your hands at what the boys say. There is no one to lend you her hairbrush.

6 The stories the boys tell in the coatroom, they're not true. You lean against the schoolyard fence alone with your eyes closed as if no one was watching, as if no one could see you standing there, Sally. What do you think about when you close your eyes like that? And why do you always have to go straight home after school? You become a different Sally. You pull your skirt straight, you rub the blue paint off your eyelids. You don't laugh, Sally. You look at your feet and walk fast to the house you can't come out from.

7

Sally, do you sometimes wish you didn't have to go home? Do you wish your feet would one day keep walking and take you far away from Mango Street, far away and maybe your feet would stop in front of a house, a nice one with flowers and big windows and steps for you to climb up two by two upstairs to where a room is waiting for you? And if you opened the little window latch and gave it a shove, the windows would swing open, all the sky would come in. There'd be no nosy neighbors watching, no motorcycles and cars, no sheets and towels and laundry. Only trees and more trees and plenty of blue sky. And you could laugh, Sally. You could close your eyes and you wouldn't have to worry what people said because you never belonged here anyway and nobody could make you sad and nobody would think you're strange because you like to dream and dream. And no one could yell at you if they saw you out in the dark leaning against a car, leaning against somebody without someone thinking you are bad, without somebody saying it is wrong, without the whole world waiting for you to make a mistake when all you wanted, all you wanted, Sally, was to love and to love and to love and to love, and no one could call that crazy.

Session 1, Multiple-choice Questions

2. What literary technique predominates in the first paragraph?

- A. metaphor
- B. personification
- ✓ C. simile
- D. symbol

Related Learning Standard for Item 2: **Learning Standard 15 (p. 86)**

3. What does the statement "... you don't have a best friend to lean against the schoolyard fence with. . ." mean?

- A. Sally is a loner who does not want friends.
- ✓ B. Sally lost her best friend because of a fight.
- C. Sally's father will not permit her to have friends.
- D. Sally is avoided by the rest of the students.

Related Learning Standard for Item 3: **Learning Standard 12 (p. 85)**

4. The first sentence of paragraph 7 is "Sally, do you sometimes wish you didn't have to go home?" The function of the comma after *Sally* is to punctuate

- A. a noun in apposition.
- ✓ B. a noun in direct address.
- C. an interrupting expression.
- D. an introductory clause.

Related Learning Standard for Item 4: **Learning Standard 5 (p. 84)**

5. According to the narrator, what does Sally desire most?

- A. friendship
- B. trust
- C. self-respect
- ✓ D. love

Related Learning Standard for Item 5: **Learning Standard 9 (p. 85)**

Session 1, Reading Selection #2

This selection contains part of an interview as well as a poem. For his book and PBS series, The Language of Life, Bill Moyers interviewed Jimmy Santiago Baca, who taught himself to read and write while in prison. The poem refers to Baca's appearance before a parole board. When you have finished reading this selection, answer the questions that follow.

I APPLIED FOR THE BOARD**An interview with Jimmy Santiago Baca**

by Bill Moyers

MOYERS: What about "I Applied for the Board"? Did you literally try to read them your poems?

BACA: I *did*. It was my only way of telling them *this* is who I'd become, is who I am, and *this* is the record. But they said, "*Our* record indicates you worked," to which I said, "*My* record is different—*this* is my record."

MOYERS: The poetry?

BACA: Yes, and they said, "We don't want to hear *your* record."

I APPLIED FOR THE BOARD

- 1 . . . a flight of fancy and breath of fresh air
Is worth all the declines in the world.
It was funny though when I strode into the Board
And presented myself before the Council
- 5 With my shaggy-haired satchel, awiry
With ends of shoestrings and guitar strings
Holding it together, brimming with poems.
I was ready for my first grand, eloquent,
Booming reading of a few of my poems—
- 10 When the soft, surprised eyes
Of the chairman looked at me and said no.
And his two colleagues sitting on each side of him,
Peered at me through bluemetal eyes like rifle scopes,
And I like a deer in the forest heard the fresh,
- 15 Crisp twig break under my cautious feet,
As they surrounded me with quiet questions,
Closing in with grim sour looks, until I heard
The final shot burst from their mouths
That I had not made it, and felt the warm blood
- 20 Gush forth in my breast, partly from the wound,
And partly from the joy that it was over.

MOYERS: That's a daunting problem for the poet—getting people to hear your poems.

BACA: They usually surface as history sooner or later. The historians find them.

MOYERS: Yes, but what good does it do *you*? You're gone.

BACA: You can't worry about that. You can't worry about when you're going to get paid for it either. If you worry about whether people are going to hear it, and if you worry about whether you're going to get paid, you are in the wrong biz.

MOYERS: How *do* you survive?

BACA: You really have to survive by an act of grace, as in that great title of Robert Bly's book *The Light Around the Body*. In the greatest way, you really have to have faith in the unknown, otherwise you won't write.

Session 1, Multiple-choice Questions

6. While in prison, Jimmy Baca taught himself to read and write in Standard English. He went before the parole board armed with poems because he
- A. knew he had no chance of parole.
 - B. had a need to express himself to an audience.
 - ✓ C. wanted to show how he had improved himself.
 - D. wanted to prove that he could read and write.

Related Learning Standard for Item 6: **Learning Standard 6 (p. 85)**

7. In line 5 of the poem, the poet's invented word *awiry* serves as an
- ✓ A. adjective modifying *satchel*.
 - B. adverb modifying *presented*.
 - C. adjective modifying *poems*.
 - D. adverb modifying *holding*.

Related Learning Standard for Item 7: **Learning Standard 5 (p. 84)**

8. Line 10 of the poem, "When the soft, surprised eyes," contains an example of
- A. understatement.
 - B. simile.
 - C. hyperbole.
 - ✓ D. alliteration.

Related Learning Standard for Item 8: **Learning Standard 15 (p. 86)**

9. Line 13 of the poem, "Peered at me through bluemetal eyes like rifle scopes," contains an example of
- A. metaphor.
 - ✓ B. simile.
 - C. assonance.
 - D. rhyme.

Related Learning Standard for Item 9: **Learning Standard 15 (p. 86)**

Session 1, Open-response Question

10. Using information from the interview as well as the poem, explain Baca's attitude toward writing poems. Include evidence from the poem and interview to support your answer.

Related Learning Standard for Item 10: **Learning Standard 11** (p. 85)

Session 1, Reading Selection #3

Jack London was an American novelist, reporter, and social critic. He lived in San Francisco when it was struck by an earthquake in 1906. This is his eyewitness account of that earthquake. Read the account and answer the questions that follow.

Jack London / The Story of an Eyewitness

[An Account of the San Francisco Earthquake]

Collier's Weekly, May 1906

1 The earthquake shook down in San Francisco hundreds of thousands of dollars' worth of walls and chimneys. But the conflagration that followed burned up hundreds of millions of dollars' worth of property. There is no estimating within hundreds of millions the actual damage wrought. Not in history has a modern imperial city been so completely destroyed. San Francisco is gone! Nothing remains of it but memories and a fringe of dwelling houses on its outskirts. Its industrial section is wiped out. Its social and residential section is wiped out. The factories and warehouses, the great stores and newspaper buildings, the hotels and the palaces of the nabobs, are all gone. Remains only the fringe of dwelling houses on the outskirts of what was once San Francisco.

2 Within an hour after the earthquake shock the smoke of San Francisco's burning was a lurid tower visible a hundred miles away. And for three days and nights this lurid tower swayed in the sky, reddening the sun, darkening the day, and filling the land with smoke.

3 On Wednesday morning at a quarter past five came the earthquake. A minute later the flames were leaping upward. In a dozen different quarters south of Market Street, in the working-class ghetto, and in the factories, fires started. There was no opposing the flames. There was no organization, no communication. All the cunning adjustments of a twentieth-century city had been smashed by the earthquake. The streets were humped into ridges and depressions and piled with debris of fallen walls. The steel rails were twisted into perpendicular and horizontal angles. The telephone and telegraph systems were disrupted. And the great water mains had burst. All the shrewd contrivances and safeguards of man had been thrown out of gear by thirty seconds' twitching of the earth's crust.

4 By Wednesday afternoon, inside of twelve hours, half the heart of the city was gone. At that time I watched the vast conflagration from out on the bay. It was dead calm. Not a flicker of wind stirred. Yet from every side wind was pouring in upon the city. East, west, north, and south, strong winds were blowing upon the doomed city. The heated air rising made an enormous suck. Thus did the fire of itself build its own colossal chimney through the atmosphere. Day and night, this dead calm continued, and yet, near to the flames, the wind was often half a gale, so mighty was the suck.

5 The edict which prevented chaos was the following proclamation by Mayor E. E. Schmitz:

6 “The Federal Troops, the members of the Regular Police Force, and all Special Police Officers have been authorized to kill any and all persons found engaged in looting or in the commission of any other crime.

7 “I have directed all the Gas and Electric Lighting Companies not to turn on gas or electricity until I order them to do so; you may therefore expect the city to remain in darkness for an indefinite time.

8 “I request all citizens to remain at home from darkness until daylight of every night until order is restored.

9 “I warn all citizens of the danger of fire from damaged or destroyed chimneys, broken or leaking gas pipes or fixtures, or any like cause.”

10 Wednesday night saw the destruction of the very heart of the city. Dynamite was lavishly used, and many of San Francisco’s proudest structures were crumbled by man himself into ruins, but there was no withstanding the onrush of the flames. Time and again successful stands were made by the fire fighters, and every time the flames flanked around on either side, or came up from the rear, and turned to defeat the hard-won victory.

11 An enumeration of the buildings destroyed would be a directory of San Francisco. An enumeration of the buildings undestroyed would be a line and several addresses. An enumeration of the deeds of heroism would stock a library and bankrupt the Carnegie medal fund. An enumeration of the dead—will never be made. All vestiges of them were destroyed by the flames. The number of the victims of the earthquake will never be known. South of Market Street, where the loss of life was particularly heavy, was the first to catch fire.

12 Remarkable as it may seem, Wednesday night, while the whole city crashed and roared into ruin, was a quiet night. There were no crowds. There was no shouting and yelling. There was no hysteria, no disorder. I passed Wednesday night in the part of the advancing flames, and in all those terrible hours I saw not one woman who wept, not one man who was excited, not one person who was in the slightest degree panic-stricken.

13 Before the flames, throughout the night, fled tens of thousands of homeless ones. Some were wrapped in blankets. Others carried bundles of bedding and dear household treasures. Sometimes a whole family was harnessed to a carriage or delivery wagon that was weighted down with their possessions. Baby buggies, toy wagons, and gocarts were used as trucks, while every other person was dragging a trunk. Yet everybody was gracious. The most perfect courtesy obtained. Never in all San Francisco’s history were her people so kind and courteous as on this night of terror.

14 All the night these tens of thousands fled before the flames. Many of them, the poor people from the labor ghetto, had fled all day as well. They had left their homes burdened with possessions. Now and again they lightened up, flinging out upon the street clothing and treasures they had dragged for miles.

Session 1, Multiple-choice Questions

11. In paragraph 1, the word *nabobs* means

- ✓ A. people of wealth and prominence.
- B. foreign visitors.
- C. members of the police force.
- D. factory and warehouse workers.

Related Learning Standard for Item 11: **Learning Standard 8 (p. 85)**

12. In paragraph 2, what is the *lurid tower*?

- A. a tall, burning building
- ✓ B. smoke from the fire
- C. the reddened sky
- D. a swaying bridge in the distance

Related Learning Standard for Item 12: **Learning Standard 15 (p. 86)**

13. In what paragraph does the account of the sequence of events begin?

- A. paragraph 1
- B. paragraph 2
- ✓ C. paragraph 3
- D. paragraph 4

Related Learning Standard for Item 13: **Learning Standard 13 (p. 85)**

14. In paragraph 4, how does the writer create a vivid image of the fire?

- ✓ A. He contrasts the dead calm of the bay with the winds of the fire.
- B. He lets the reader know how much time has passed.
- C. He describes the city as “doomed.”
- D. He has fled to a boat on the bay, so the fire must be intense.

Related Learning Standard for Item 14: **Learning Standard 15 (p. 86)**

15. In paragraph 5, what is an *edict*?

- A. a warning
- B. a suggestion
- C. a request
- ✓ D. a formal command

Related Learning Standard for Item 15: **Learning Standard 4 (p. 84)**

16. What is the best inference we can make from the mayor's proclamation?

- A. Citizens were afraid to stay in their homes.
- ✓ B. There was disorder and confusion after the earthquake.
- C. Most people were looting other people's homes.
- D. Uncontrollable chaos had broken out.

Related Learning Standard for Item 16: **Learning Standard 13 (p. 85)**

17. In paragraph 11, what does *enumeration* mean?

- A. report
- B. book
- C. number
- ✓ D. list

Related Learning Standard for Item 17: **Learning Standard 4 (p. 84)**

18. In this account, for what period of time has the author provided a description?

- A. about two hours
- B. twelve hours
- ✓ C. about 24 hours
- D. two days

Related Learning Standard for Item 18: **Learning Standard 9 (p. 85)**

Session 1, Open-response Question

19. The author has used vivid language throughout this account to impress his readers with the horror of the aftermath of the earthquake. Choose two examples of vivid language from the account and explain how each furthered the author's purpose.

Related Learning Standard for Item 19: **Learning Standard 15** (p. 86)

Session 2, Reading Selection #1

The following selection consists of two poems, "To Daffodils" by Robert Herrick, and "I Wandered Lonely as a Cloud" by William Wordsworth. Read the two poems and answer the questions that follow.

To Daffodils

Robert Herrick

- 1 Fair daffodils, we weep to see
 You haste away so soon:
 As yet the early-rising sun
 Has not attained his noon.
- 5 Stay, stay,
 Until the hasting day
 Has run
 But to the evensong;
 And, having prayed together, we
- 10 Will go with you along.
 We have short time to stay, as you,
 We have as short a spring;
 As quick a growth to meet decay,
 As you, or anything.
- 15 We die,
 As your hours do, and dry
 Away,
 Like to the summer's rain;
 Or as the pearls of morning's dew
- 20 Ne'er to be found again.

**I Wandered Lonely
as a Cloud**

William Wordsworth

- 1 I wandered lonely as a cloud
 That floats on high o'er vales and hills,
 When all at once I saw a crowd,
 A host, of golden daffodils;
- 5 Beside the lake, beneath the trees,
 Fluttering and dancing in the breeze.
- Continuous as the stars that shine
 And twinkle on the milky way,
 They stretched in never-ending line
- 10 Along the margin of a bay:
 Ten thousand saw I at a glance,
 Tossing their heads in sprightly dance.
- The waves beside them danced; but they
 Out-did the sparkling waves in glee:
- 15 A poet could not but be gay,
 In such a jocund company:
 I gazed—and gazed—but little thought
 What wealth the show to me had brought:
- For oft, when on my couch I lie
- 20 In vacant or in pensive mood,
 They flash upon that inward eye
 Which is the bliss of solitude;
 And then my heart with pleasure fills,
 And dances with the daffodils.

Session 2, Multiple-choice Questions

20. In Robert Herrick's poem "To Daffodils," what time of day is it when the poet first addresses the daffodils?

- ✓ A. morning
- B. noon
- C. evening
- D. night

Related Learning Standard for Item 20: **Learning Standard 9** (p. 85)

21. In line 6 of "To Daffodils," what part of speech is the word "hasting"?

- A. adverb
- B. verb
- ✓ C. adjective
- D. noun

Related Learning Standard for Item 21: **Learning Standard 5** (p. 84)

22. What is the rhyme scheme of the first stanza of "To Daffodils"?

- A. ABABCDCEDE
- B. ABCDEECDBA
- C. ABCABCDDEE
- ✓ D. ABCBDDCEAE

Related Learning Standard for Item 22: **Learning Standard 14** (p. 85)

23. The comparison of people to flowers in "To Daffodils" is an example of

- A. assonance.
- ✓ B. analogy.
- C. allusion.
- D. alliteration.

Related Learning Standard for Item 23: **Learning Standard 15** (p. 86)

24. In line 12 of "I Wandered Lonely as a Cloud," when the poet says the daffodils are "Tossing their heads in sprightly dance," it is an example of

- ✓ A. personification.
- B. consonance.
- C. allusion.
- D. hyperbole.

Related Learning Standard for Item 24: **Learning Standard 15 (p. 86)**

25. In lines 21–22 of "I Wandered Lonely as a Cloud," when the poet says, "They flash upon that inward eye / Which is the bliss of solitude," he means that

- A. he is looking at photographs of daffodils.
- ✓ B. remembering the daffodils brings him pleasure.
- C. the daffodils ruin his solitude.
- D. his inward eye is usually dark.

Related Learning Standard for Item 25: **Learning Standard 14 (p. 85)**

26. In line 16 of "I Wandered Lonely as a Cloud," the word *jocund* means

- A. melancholy.
- B. thoughtful.
- ✓ C. happy.
- D. rhythmic.

Related Learning Standard for Item 26: **Learning Standard 4 (p. 84)**

27. In "I Wandered Lonely as a Cloud," the poet enhances the meaning of his poem through the use of

- ✓ A. nature.
- B. research.
- C. logical ideas.
- D. formal language.

Related Learning Standard for Item 27: **Learning Standard 14 (p. 85)**

Session 2, Open-response Question

28. How is the theme of “I Wandered Lonely as a Cloud” different from the theme of “To Daffodils”? Use specific evidence from both poems to support your answer.

Related Learning Standard for Item 28: **Learning Standard 14 (p. 85)**

Session 3, Reading Selection #1

The following selection about General Ulysses S. Grant and General Robert E. Lee is an essay written by Civil War novelist Bruce Catton. As you read, pay attention to how the author develops the contrast between Generals Grant and Lee. When you have finished reading, answer the questions that follow.

Grant and Lee: A Study in Contrasts

by Bruce Catton

When Ulysses S. Grant and Robert E. Lee met in the parlor of a modest house at Appomattox Court House, Virginia, on
1 April 9, 1865, to work out the terms for the surrender of Lee's Army of Northern Virginia, a great chapter in American life came to a close, and a great new chapter began.

These men were bringing the Civil War to its virtual finish. To be sure, other armies had yet to surrender, and for a few days the fugitive Confederate government would struggle desperately and vainly, trying to find
2 some way to go on living now that its chief support was gone. But in effect it was all over when Grant and Lee signed the papers. And the little room where they wrote out the terms was the scene of one of the poignant, dramatic contrasts in American history.

They were two strong men, these oddly different generals, and they represented the strengths of two conflicting currents that, through them, had come into final collision.
3

Back of Robert E. Lee was the notion that
4 the old aristocratic concept might somehow survive and be dominant in American life.

Lee was tidewater Virginia, and in his background were family, culture, and tradition . . . the age of chivalry transplanted to a New
5 World which was making its own legends and its own myths. He embodied a way of life that had come down through the age of knighthood and the English country squire.

America was a land that was beginning all over again, dedicated to nothing much more complicated than the rather hazy belief that all men had equal rights, and should have an equal chance in the world. In such a land, Lee stood for the feeling that it was somehow of advantage to human society to have a pronounced inequality in the social structure. There should be a leisure class, backed by ownership of land; in turn, society itself should be keyed to the land as the chief source of wealth and influence. It would bring forth (according to this ideal) a class of men with a strong sense of obligation to the community; men who lived not to gain advantage for themselves, but to meet the solemn obligations which had been laid on them by the very fact that they were privileged. From them the country would get its leadership; to them it could look for the higher values—of thought, of conduct, of personal deportment—to give it strength and virtue.

Lee embodied the noblest elements of this aristocratic ideal. Through him, the landed nobility justified itself. For four years, the Southern states had fought a desperate war to uphold the ideals for which Lee stood. In the end, it almost seemed as if the Confederacy fought for Lee; as if he himself was the Confederacy . . . the best thing that the way of life for which the Confederacy stood could
6

ever have to offer. He had passed into legend before Appomattox. Thousands of tired, underfed, poorly clothed Confederate soldiers, long-since past the simple enthusiasm of the early days of the struggle, somehow considered Lee the symbol of everything for which they had been willing to die. But they could not quite put this feeling into words. If the Lost Cause, sanctified by so much heroism and so many deaths, had a living justification, its justification was General Lee.

7 Grant, the son of a tanner on the Western frontier, was everything Lee was not. He had come up the hard way, and embodied nothing in particular except the eternal toughness and sinewy fiber of the men who grew up beyond the mountains. He was one of a body of men who owed reverence and obeisance to no one, who were self-reliant to a fault, who cared hardly anything for the past but who had a sharp eye for the future.

8 These frontier men were the precise opposites of the tidewater aristocrats. Back of them, in the great surge that had taken people over the Alleghenies and into the opening Western country, there was a deep, implicit dissatisfaction with a past that had settled into grooves. They stood for democracy, not from any reasoned conclusion about the proper ordering of human society, but simply because they had grown up in the middle of democracy and knew how it worked. Their society might have privileges, but they would be privileges each man had won for himself. Forms and patterns meant nothing. No man was born to anything, except perhaps to a chance to show how far he could rise. Life was competition.

9 Yet along with this feeling had come a deep sense of belonging to a national community. The Westerner who developed a farm, opened a shop, or set up in business as a trader, could hope to prosper only as his own community prospered—and his community ran from the Atlantic to the Pacific and from Canada down

to Mexico. If the land was settled, with towns and highways and accessible markets, he could better himself. He saw his fate in terms of the nation's own destiny. As its horizons expanded, so did his. He had, in other words, an acute dollars-and-cents stake in the continued growth and development of his country.

10 And that, perhaps, is where the contrast between Grant and Lee becomes most striking. The Virginia aristocrat, inevitably, saw himself in relation to his own region. He lived in a static society which could endure almost anything except change. Instinctively, his first loyalty would go to the locality in which that society existed. He would fight to the limit of endurance to defend it, because in defending it he was defending everything that gave his own life its deepest meaning.

11 The Westerner, on the other hand, would fight with an equal tenacity for the broader concept of society. He fought so because everything he lived by was tied to growth, expansion, and a constantly widening horizon. What he lived by would survive or fall with the nation itself. He could not possibly stand by unmoved in the face of an attempt to destroy the Union. He would combat it with everything he had, because he could only see it as an effort to cut the ground out from under his feet.

12 So Grant and Lee were in complete contrast, representing two diametrically opposed elements in American life. Grant was the modern man emerging; beyond him, ready to come on the stage, was the great age of steel and machinery, of crowded cities and a restless, burgeoning vitality. Lee might have ridden down from the old age of chivalry, lance in hand, silken banner fluttering over his head. Each man was the perfect champion of his cause, drawing both his strengths and his weaknesses from the people he led.

13 Yet it was not all contrast, after all. Different as they were—in background, in personality, in underlying aspiration—these

two great soldiers had much in common. Under everything else, they were marvelous fighters. Furthermore, their fighting qualities were really very much alike.

14 Each man had, to begin with, the great virtue of utter tenacity and fidelity. Grant fought his way down the Mississippi Valley in spite of acute personal discouragement and profound military handicaps. Lee hung on in the trenches at Petersburg after hope itself had died. In each man there was an indomitable quality . . . the born fighter's refusal to give up as long as he can still remain on his feet and lift his two fists.

15 Daring and resourcefulness they had, too; the ability to think faster and move faster than the enemy. These were the qualities which gave Lee the dazzling campaigns of Second Manassas and Chancellorsville and won Vicksburg for Grant.

16 Lastly, and perhaps greatest of all, there was the ability, at the end, to turn quickly from war to peace once the fighting was over. Out of the way these two men behaved at Appomattox came the possibility of a peace of reconciliation. It was a possibility not wholly realized, in the years to come, but which did, in the end, help the two sections to become one nation again . . . after a war whose bitterness might have seemed to make such a reunion wholly impossible. No part of either man's life became him more than the part he played in their brief meeting in the McLean house at Appomattox. Their behavior there put all succeeding generations of Americans in their debt. Two great Americans, Grant and Lee—very different, yet under everything very much alike. Their encounter at Appomattox was one of the great moments of American history.

Session 3, Multiple-choice Questions

29. Which paragraph states a major theme of this essay?

- A. paragraph 1
- B. paragraph 2
- ✓ C. paragraph 3
- D. paragraph 5

Related Learning Standard for Item 29: **Learning Standard 13** (p. 85)

30. Which idea about Grant and Lee is **most** thoroughly developed in this essay?

- A. Both generals came from aristocratic backgrounds.
- B. They had nothing at all in common.
- C. Each personally hated the other.
- ✓ D. They represented opposing ways of life.

Related Learning Standard for Item 30: **Learning Standard 13** (p. 85)

31. According to the author, General Lee reflected a culture that believed

- ✓ A. there should be different levels of social structure.
- B. English legends and myths should be adopted in America.
- C. American landowners should be knighted.
- D. everyone should be equal in all ways.

Related Learning Standard for Item 31: **Learning Standard 9** (p. 85)

32. Which underlined word in the following excerpts from *Grant and Lee* derives from the Latin word *licere*, which means “to be permitted”?

“. . .the age of chivalry transplanted to a New World which was making its own legends and its own myths.”
 “There should be a leisure class, backed by ownership of land; in turn, society itself should be keyed to the land as the chief source of wealth and influence.”
 “Different as they were in background, in personality, in underlying aspirations —these two great soldiers . . .”

- A. legend
- ✓ B. leisure
- C. influence
- D. underlying

Related Learning Standard for Item 32: **Learning Standard 7 (p. 85)**

33. According to the author, why did Grant’s supporters want to preserve the Union?

- A. They were personally devoted to General Grant.
- B. Anti-slavery arguments had a great effect on them.
- C. They wanted to control resources in the South.
- ✓ D. Their future success depended on a united country.

Related Learning Standard for Item 33: **Learning Standard 9 (p. 85)**

34. In paragraphs 10 and 11, the author

- A. offers further information about the Civil War.
- B. explains the geographic differences between the North and South.
- ✓ C. summarizes the regional differences symbolized by Grant and Lee.
- D. contrasts the military strategies of Generals Grant and Lee.

Related Learning Standard for Item 34: **Learning Standard 13 (p. 85)**

35. What did Generals Grant and Lee have in common?

- A. personality
- B. backgrounds
- C. aspirations
- ✓ D. tenacity

Related Learning Standard for Item 35: **Learning Standard 9** (p. 85)

36. What shift occurs in paragraphs 13 through 16?

- ✓ A. The author shows similarities between the two men.
- B. One way of life is shown as being superior to the other.
- C. The author reveals his opinion on who was the best general.
- D. The author changes his mind about his subject.

Related Learning Standard for Item 36: **Learning Standard 13** (p. 85)

Session 3, Open-response Question

37. Is paragraph 16 an effective conclusion for this essay? Cite evidence from the essay to support your answer.

Related Learning Standard for Item 37: **Learning Standard 13** (p. 85)

Session 3, Reading Selection #2

The following selection is an excerpt from the play Fences by August Wilson. As you read this excerpt, think about how the playwright develops characters as well as theme. When you have finished reading, answer the questions that follow.

FENCES

by August Wilson

CORY: Mama . . . I got something to tell you. I don't know how to tell you this . . . but I've got to tell you . . . I'm not going to Papa's funeral.

ROSE: Boy, hush your mouth. That's your daddy you talking about. I don't want hear that kind of talk this morning. I done raised you to come to this? You standing there all healthy and grown talking about you ain't going to your daddy's funeral?

CORY: Mama . . . listen . . .

ROSE: I don't want to hear it, Cory. You just get that thought out of your head.

CORY: I can't drag Papa with me everywhere I go. I've got to say no to him. One time in my life I've got to say no.

ROSE: Don't nobody have to listen to nothing like that. I know you and your daddy ain't seen eye to eye, but I ain't got to listen to that kind of talk this morning. Whatever was between you and your daddy . . . the time has come to put it aside. Just take it and set it over there on the shelf and forget about it. Disrespecting your daddy ain't gonna make you a man, Cory. You got to find a way to come to that on your own. Not going to your daddy's funeral ain't gonna make you a man.

CORY: The whole time I was growing up . . . living in his house . . . Papa was like a shadow that followed you everywhere. It weighed on you and sunk into your flesh. It would wrap around you and lay there until you couldn't tell which one was you anymore. That shadow digging in your flesh. Trying to crawl in. Trying to live through you. Everywhere I looked, Troy Maxson was staring back at me . . . hiding under the bed . . . in the closet. I'm just saying I've got to find a way to get rid of that shadow, Mama.

ROSE: You just like him. You got him in you good.

CORY: Don't tell me that, Mama.

ROSE: You Troy Maxson all over again.

CORY: I don't want to be Troy Maxson. I want to be me.

ROSE: You can't be nobody but who you are, Cory. That shadow wasn't nothing but you growing into yourself. You either got to grow into it or cut it down to fit you. But that's all you got to make life with. That's all you got to measure yourself against that world out there. Your daddy wanted you to be everything he wasn't . . . and at the same time he tried to make you into everything he was. I don't know if he was right or wrong . . . but I do know he meant to do more good than he meant to do harm. He wasn't always right. Sometimes when he touched he bruised. And sometimes when he took me in his arms he cut.

When I first met your daddy I thought . . . Here is a man I can lay down with and make a baby. That's the first thing I thought when I seen him. I was thirty years old and had done seen my share of men. But when he walked up to me and said, "I can dance a waltz that'll make you dizzy," I thought, Rose Lee, here is a man that you can open yourself up to and be filled to bursting. Here is a man that can fill all them empty spaces you been tipping around the edges of. One of them empty spaces was being somebody's mother.

I married your daddy and settled down to cooking his supper and keeping clean sheets on the bed. When your daddy walked through the house he was so big he filled it up. That was my first mistake. Not to make him leave some room for me. For my part in the matter. But at that time I wanted that. I wanted a house that I could sing in. And that's what your daddy gave me. I didn't know to keep up his strength I had to give up little pieces of mine. I did that. I took on his life as mine and mixed up the pieces so that you couldn't hardly tell which was which anymore. It was my choice. It was my life and I didn't have to live it like that. But that's what life offered me in the way of being a woman and I took it. I grabbed hold of it with both hands.

By the time Raynell came into the house, me and your daddy had done lost touch with one another. I didn't want to make my blessing off of nobody's misfortune . . . but I took on to Raynell like she was all them babies I had wanted and never had.

(The phone rings.)

Like I'd been blessed to relive a part of my life. And if the Lord see fit to keep up my strength . . . I'm gonna do her just like your daddy did you. I'm gonna give her the best of what's in me.

Session 3, Multiple-choice Questions

38. Cory doesn't want to attend his father's funeral because he

- A. is overwhelmed with grief for his father's death.
- B. experiences no emotion about losing his father.
- C. lacks the physical strength to sit through the service.
- ✓ D. feels overwhelmed by his father's presence.

Related Learning Standard for Item 38: **Learning Standard 12 (p. 85)**

39. Which word best describes the character of Troy Maxson?

- A. nurturing
- ✓ B. domineering
- C. reserved
- D. tentative

Related Learning Standard for Item 39: **Learning Standard 12 (p. 85)**

40. Cory says that his father "was like a shadow that followed you everywhere."
This phrase is an example of

- A. irony.
- B. soliloquy.
- ✓ C. simile.
- D. oxymoron.

Related Learning Standard for Item 40: **Learning Standard 15 (p. 86)**

41. Rose says to Cory, "Boy, hush your mouth. That's your daddy you talking about. I don't want hear that kind of talk this morning. I done raised you to come to this? You standing there all healthy and grown talking about you ain't going to your daddy's funeral?"

The author recreates an oral dialect in order to

- A. show his ability to write well.
- ✓ B. make the conversation realistic.
- C. create the mood of a funeral.
- D. emphasize Cory's age.

Related Learning Standard for Item 41: **Learning Standard 6** (p. 85)



V. Mathematics, Grade 4

Massachusetts Department of Education

Curriculum Framework *Learning Standards/*

MCAS Reporting Categories

Mathematics, Grade 4

The 1999 MCAS Mathematics test was based on the learning standards of the Massachusetts *Mathematics Curriculum Framework*.¹⁴ The *Framework* identifies four major content strands, which also serve as MCAS reporting categories:¹⁵

- Number Sense
- Patterns, Relations, and Functions
- Geometry and Measurement
- Statistics and Probability

At grade 4, the *Framework* divides each of the first three strands into multiple substrands. These substrands are specifically referenced as one tool for interpreting school and district results in the MCAS document, *Guide to Interpreting the Spring 1999 MCAS Reports for Schools and Districts* due for release later in 1999. Learning standards are grouped below by both reporting category and substrand headings, and are directly quoted from the *Framework*; applicable *Framework* page numbers are given in parentheses following the headings.

Each common item in the second section of this chapter is followed by a reference to the reporting category and substrand that contain the learning standards to which the item is related.

Number Sense

Number Sense and Numeration (*Framework*, p. 34)

Students engage in problem solving, communicating, reasoning, and connecting to

- construct number meaning by using manipulatives and other physical materials to represent concepts of numbers in the real world.
- demonstrate an understanding of our numeration system by relating counting, grouping, and place value concepts.
- interpret the multiple uses of numbers by taking real-world situations and translating them into numerical statements.

¹⁴ Massachusetts Department of Education, *Mathematics Curriculum Framework: Achieving Mathematical Power* (Malden, 1996).

¹⁵ Please note that these MCAS reporting categories differ from those used in the 1998 MCAS reports to school and districts. The 1998 MCAS reporting categories are referenced as substrands in this chapter.

Concepts of Whole Number Operations (*Framework*, p. 35)

Students engage in problem solving, communicating, reasoning, and connecting to

- model and discuss a variety of problem situations to help students move from the concrete to the abstract.
- relate the mathematical language and symbolism of operations to problem situations.
- identify a variety of problem structures that can be represented by a single operation.
- know when to use the operations of addition, subtraction, multiplication, and division; and describe their relationships.

Fractions and Decimals (*Framework*, p. 36)

Students engage in problem solving, communicating, reasoning, and connecting to

- demonstrate an understanding of the basic concepts of fractions, mixed numbers, and decimals.
- use models to relate fractions to decimals, find equivalent fractions, and explore operations on fractions and decimals.
- apply fractions and decimals to problem situations.

Estimation (*Framework*, p. 37)

Students engage in problem solving, communicating, reasoning, and connecting to

- describe the strategies used in exploring estimation.
- determine when an estimate is appropriate.
- apply estimation when working with quantities, measurement, and computation.
- use estimation to check solutions to determine if the results of computational problems make sense.

Whole Number Computation (*Framework*, p. 38)

Students engage in problem solving, communicating, reasoning, and connecting to

- model, explain, and develop proficiency with basic facts and algorithms.
- use calculators in appropriate computational situations.

Patterns, Relations, and Functions

Patterns and Relationships (*Framework*, p. 57)

Students engage in problem solving, communicating, reasoning, and connecting to

- identify, describe, extend, and create a wide variety of patterns.
- represent and describe mathematical relationships.
- explore the use of variables and open sentences to express relationships.
- use patterns and relationships to analyze mathematical situations.

Algebra/Mathematical Structures (*Framework*, pp. 58-59)

Students engage in problem solving, communicating, reasoning, and connecting to

- discover how to form, then write, number sentences for real problems.
- investigate and describe ways to find missing components in number sentences.
- demonstrate through hands-on activities, an understanding of maintaining balances in number sentences.
- explain the use of variables in number sentences.
- explore and demonstrate an understanding of commutative properties for addition and multiplication.

Geometry and Measurement

Geometry and Spatial Sense (*Framework*, p. 72)

Students engage in problem solving, communicating, reasoning, and connecting to

- describe, model, draw, and classify shapes.
- investigate and predict the results of combining, subdividing, and changing shapes.
- develop spatial sense.
- use geometric ideas to develop numerical ideas.
- recognize and appreciate geometry in the world.

Measurement (*Framework*, p. 73)

Students engage in problem solving, communicating, reasoning, and connecting to

- demonstrate the attributes of length, capacity, weight, area, volume, time, temperature, and angle.
- use the process of measuring and the concepts related to units of measurement.
- make and use estimates of measurement.
- measure in everyday problem situations.

Statistics and Probability

Statistics and Probability (*Framework*, p. 88)

Students engage in problem solving, communicating, reasoning, and connecting to

- collect, organize, and describe data.
- construct, read, and interpret displays of data.
- formulate and solve problems that involve collecting and analyzing data.
- explore and describe the concepts of chance.

MCAS Spring 1999 Common Test Items

Mathematics, Grade 4

Test Administration Sessions

Grade 4 MCAS Student Test Booklets contained 2 separate Mathematics test sessions. Each session included multiple-choice, short-answer, and open-response questions.

Mathematics Tool Kits

During testing, each grade 4 student was provided with a Mathematics Tool Kit. A sample of that Tool Kit is included in Appendix A of this document. No other reference tools or materials were allowed during grade 4 Mathematics testing sessions.

Statistics and Probability

Since the *Framework* does not divide the *Statistics and Probability* strand into substrands at grade 4, items in this chapter that assess learning standards from this strand indicate “NA” (“Not Applicable”) as the related substrand in the shaded bar following the item.

Session 1, Multiple-choice Questions

Use the information in the box below to answer question 1.

Maria is playing a game with a number cube. The numbers 1–6 are on the cube. She tosses the number cube five times.



1. In this game, what is the HIGHEST total she could make in five tosses?
 - A. 17
 - B. 21
 - C. 25
 - ✓ D. 30

Reporting Category/Substrand for Item 1: Number Sense/Whole Number Computation (p. 118)

2. A bag of pretzels weighs between one and two pounds. Which of these could be the weight of the pretzels? (1 pound = 16 ounces)
 - A. 10 ounces
 - B. 14 ounces
 - ✓ C. 24 ounces
 - D. 36 ounces

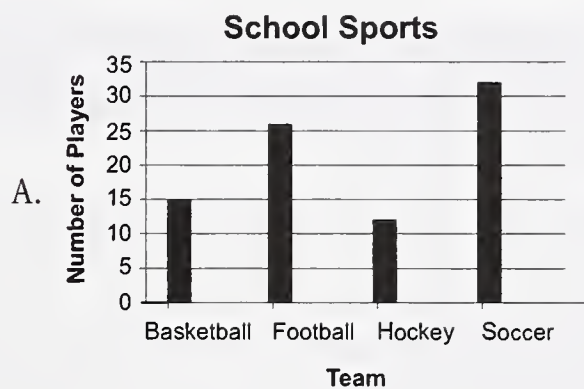
Reporting Category/Substrand for Item 2: Geometry and Measurement/Measurement (p. 120)

Use the information in the chart below to answer question 3.

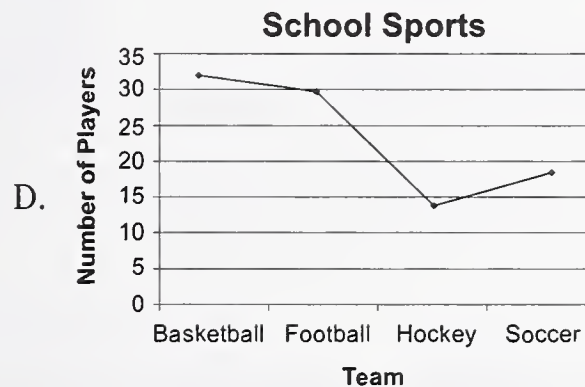
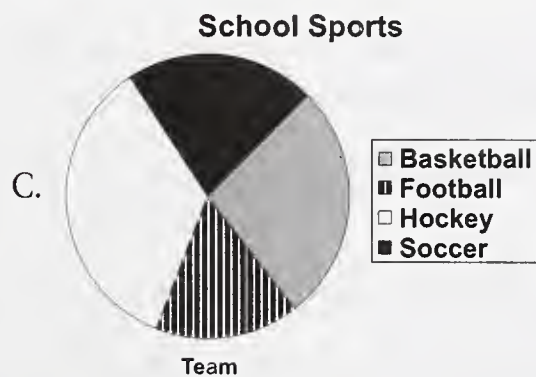
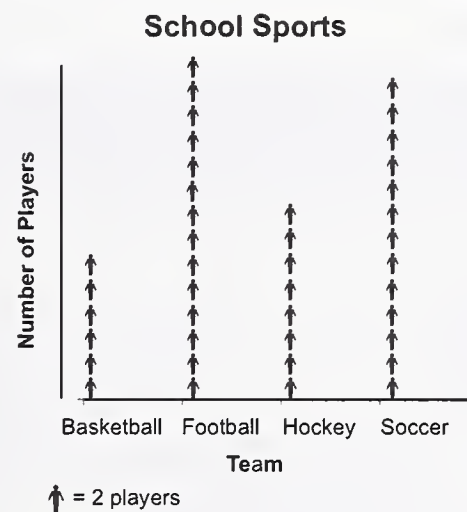
School Sports

Team	Number of Players
Basketball	12
Football	28
Hockey	16
Soccer	26

3. Barbara decided to make a graph of the number of players on her school's sports teams. Which graph correctly shows the number of players on each team?

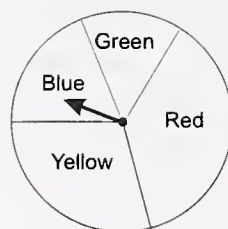


✓ B.



Reporting Category/Substrand for Item 3: *Statistics and Probability/NA (p. 120)*

4. This is a spinner for a game.



Which color are you most likely to spin?

- A. blue
- B. green
- C. yellow
- ✓ D. red

Reporting Category/Substrand for Item 4: Statistics and Probability/NA (p. 120)

5. Melvin collected acorns from the yard. First he placed them like this:




Then he placed them like this:

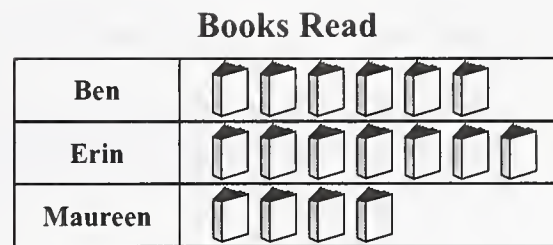



Which number sentence shows the TWO ways Melvin placed his acorns?

- ✓ A. $3 \times 4 = 4 \times 3$
- B. 3×4
- C. $3 \times 4 > 4 \times 3$
- D. $3 \times 4 \geq 4 \times 3$

Reporting Category/Substrand for Item 5: Patterns, Relations, and Functions/Algebra/Mathematical Structures (p. 119)

6. Ben's teacher made this graph to show how many books Ben, Erin, and Maureen have read so far this year. She wants them to figure out how many books each  stands for.



Key:  = ? Books

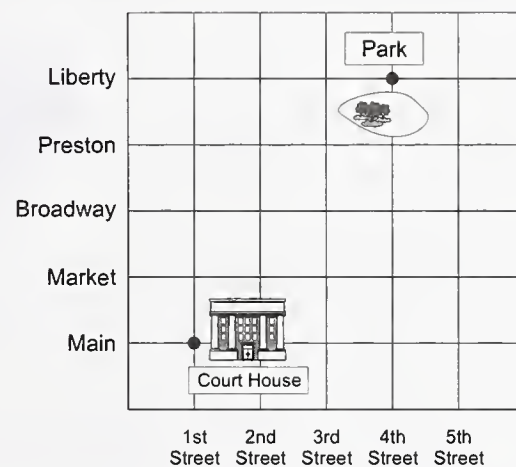
Ben knows that he has read 18 books. How many books does each  stand for?

- A. 2
- ✓ B. 3
- C. 5
- D. 6

Reporting Category/Substrand for Item 6: *Statistics and Probability/NA (p. 120)*

Use the information and the map to answer question 7.

The Wheelchair Club has planned a race for wheelchair users. The race will start at the Court House and end at the Park. The race must travel along the streets shown on the map.

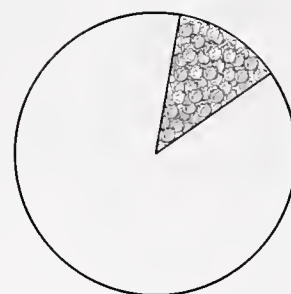


7. The club would like the route to be 11 blocks long. Which route is 11 blocks long?
- ✓ A. (1st, Main) to (1st, Preston) to (3rd, Preston) to (3rd, Market) to (4th, Market) to (4th, Liberty)
 - B. (1st, Main) to (5th, Main) to (5th, Liberty) to (4th, Liberty)
 - C. (1st, Main) to (1st, Liberty) to (3rd, Liberty) to (3rd, Market) to (4th, Market) to (4th, Liberty)
 - D. (1st, Main) to (3rd, Main) to (3rd, Broadway) to (4th, Broadway) to (4th, Liberty)

Reporting Category/Substrand for Item 7: *Patterns, Relations, and Functions/Patterns and Relationships (p. 119)*

8. A gardener is planting a flower bed as shown.

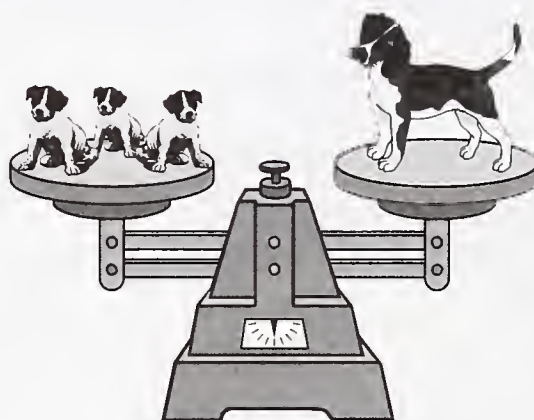
The gardener has planted 85 tulips so far. What is the BEST ESTIMATE for the total number of tulips that will be in the garden?



- A. 150–200
- B. 300–400
- ✓ C. 650–750
- D. 1200–1300

Reporting Category/Substrand for Item 8: *Number Sense/Estimation* (p. 118)

9. A mother dog and her three puppies weigh a total of 32 pounds. The mother dog's weight equals the weight of the three puppies together.



What is the weight of the mother dog?

- A. 4 pounds
- B. 8 pounds
- C. 12 pounds
- ✓ D. 16 pounds

Reporting Category/Substrand for Item 9: *Patterns, Relations, and Functions/Patterns and Relationships* (p. 119)

Session 1, Open-response Question

Use the information in the chart below to answer question 10.

Week	1	2	3	4	5	6	7
Amount	\$1.50	\$3.00	\$4.50	\$6.00			

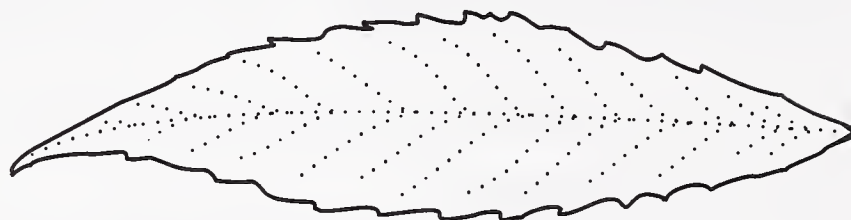
10. a. Complete the pattern for weeks 5, 6, and 7 in your Student Answer Booklet.
- b. Use numbers or words to describe the pattern.
- c. Use the pattern in the chart to write a story problem about money. Be sure your problem asks a question.
- d. Write a number sentence to go with your story problem. Be sure to include the answer in your number sentence.

Reporting Category/Substrand for Item 10: **Number Sense/Concepts of Whole Number Operations (p. 118)**

Session 1, Short-answer Questions

Use the centimeter ruler from your tool kit to measure the leaf below.

11. How many CENTIMETERS long is the leaf?



Correct Answers: 9 cm or 9

Reporting Category/Substrand for Item 11: **Geometry and Measurement/Measurement (p. 120)**

12. Compute:

$$\begin{array}{r} 256 \\ \times 98 \\ \hline \end{array}$$

Correct Answers: 25088 or 25,088

Reporting Category/Substrand for Item 12: **Number Sense/Whole Number Computation (p. 118)**

Session 1, Open-response Question

13. These shapes are quadrilaterals.



These shapes are not quadrilaterals.



- a. Write a complete definition for a quadrilateral. Be sure to tell all the important ideas about what makes a quadrilateral.

- b. This is a rhombus:

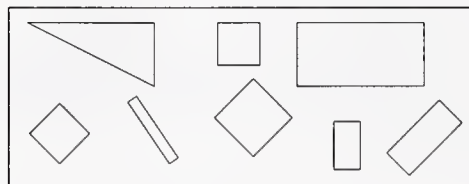


A rhombus is a special kind of quadrilateral. Explain what makes it different from other quadrilaterals.

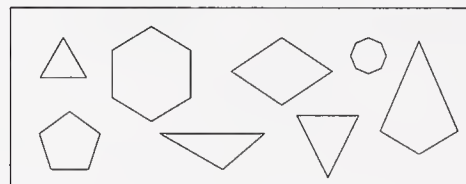
*Reporting Category/Substrand for Item 13: **Geometry and Measurement/Geometry and Spatial Sense (p. 119)***

Session 1, Multiple-choice Questions

Use the sets below to answer question 14.



I



II

14. What rule did Ray use to sort the shapes above into two groups?

- A. I = three sides
II = four sides
- B. I = big shapes
II = small shapes
- ☒ C. I = shapes with right angles
II = shapes without right angles
- D. I = shapes with four or more angles
II = shapes with less than four angles

Reporting Category/Substrand for Item 14: **Geometry and Measurement/Geometry and Spatial Sense** (p. 119)

15. What is the GREATEST number of different outfits you can make with 2 pairs of pants and 5 shirts? (Each outfit must have exactly one pair of pants and one shirt.)

- A. 5
- B. 7
- ☒ C. 10
- D. 25

Reporting Category/Substrand for Item 15: **Statistics and Probability/NA** (p. 120)

16. Which does NOT equal 452?

- ☒ A. 3 hundreds, 5 tens, 12 ones
- B. 3 hundreds, 15 tens, 2 ones
- C. 4 hundreds, 5 tens, 2 ones
- D. 4 hundreds, 4 tens, 12 ones

Reporting Category/Substrand for Item 16: **Number Sense/Number Sense and Numeration** (p. 117)

Session 1, Open-response Question

17. These are input-output tables. Each table has a different rule. When a number n is put in, it is changed by the rule so that a different number comes out. Table 1 has been completed for you.

a. Complete Tables 2 and 3 in your Student Answer Booklet.

Table 1

Input	n	8	1	5	9	21
Output	$n + 5$	13	6	10	14	26

Input-Output Rule: $n + 5$

Table 2

Input	n	2		9	7
Output	$n \times 9$	18	54		63

Input-Output Rule: $n \times 9$

Table 3

Input	n	36	16	8	
Output		9		2	7

Input-Output Rule: _____

b. Write an input-output rule for Table 3 using the letter n .

c. Use a new rule to make up your own input-output table. Complete Your Table in your Student Answer Booklet. Be sure to include your rule using the letter n . (You may NOT use the rules from Tables 1, 2, or 3.)

Your Table

Input	n				
Output					

Input-Output Rule: _____

Reporting Category/Substrand for Item 17: *Patterns, Relations, and Functions/Patterns and Relationships (p. 119)*

Session 2, Multiple-choice Questions

18. There are 60 pieces of art paper and 42 children. If each child gets one piece of art paper, how many pieces will be left for another project?

A. 9
 ✓ B. 18
 C. 27
 D. 42

Reporting Category/Substrand for Item 18: Number Sense/Whole Number Computation (p. 118)

Use the picture of marbles below to answer question 19.



19. There were 12 marbles on the floor. Lisa picked up $\frac{1}{2}$ of the 12 marbles and Tom picked up $\frac{1}{4}$ of the 12 marbles. How many marbles were picked up?

A. 2
 B. 5
 ✓ C. 9
 D. 10

Reporting Category/Substrand for Item 19: Number Sense/Fractions and Decimals (p. 118)

20. Marco is practicing for track and field day. If he practices for 360 minutes, what would you do to find out how many HOURS Marco practiced?

A. Add 60 to the total number of minutes.
 B. Subtract 60 from the total number of minutes.
 C. Multiply the total number of minutes by 60.
 ✓ D. Divide the total number of minutes by 60.

Reporting Category/Substrand for Item 20: Number Sense/Concepts of Whole Number Operations (p. 118)

21. Which number fits ALL of these clues?

- a multiple of 3
- an even number
- a multiple of 8
- not a multiple of 9

- ✓ A. 48
- B. 54
- C. 63
- D. 72

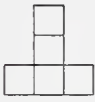



*Reporting Category/Substrand for Item 21: **Number Sense/Number Sense and Numeration** (p. 117)*

22. Your lunch time begins at 12:40 P.M. If your lunch time is 35 minutes long, what time does it end?

- A. 12:05 P.M.
- B. 1:10 P.M.
- ✓ C. 1:15 P.M.
- D. 1:30 P.M.

*Reporting Category/Substrand for Item 22: **Geometry and Measurement/Measurement** (p. 120)*

23. Which shape CAN be folded to form an OPEN box?

- ✓ A. 
- B. 
- C. 
- D. 

*Reporting Category/Substrand for Item 23: **Geometry and Measurement/Geometry and Spatial Sense** (p. 119)*

24. What number does **n** stand for in the sentence below?

$$(8 + 2) + 6 = 8 + (n + 6)$$

- ✓ A. 2
- B. 6
- C. 8
- D. 16

Reporting Category/Substrand for Item 24: *Patterns, Relations, and Functions/Algebra/Mathematical Structures* (p. 119)

The chart below shows the number of student lunches ordered for one week at Wilson Elementary School. Use the chart to answer questions 25 and 26.

School Lunches Ordered at Wilson Elementary School

Day of the Week	Number of Lunches Ordered
Monday	75
Tuesday	25
Wednesday	50
Thursday	100
Friday	150

25. What is the total number of school lunches ordered during the week?

- A. 150
- B. 250
- C. 300
- ✓ D. 400

Reporting Category/Substrand for Item 25: *Statistics and Probability/NA* (p. 120)

26. How many more students ordered school lunches on Friday than on Monday?

- A. 55
- B. 65
- ✓ C. 75
- D. 85

Reporting Category/Substrand for Item 26: *Statistics and Probability/NA* (p. 120)

Session 2, Open-response Question

Use the information in the chart to answer question 27.

School Lunches Ordered at Wilson Elementary School

Day of the Week	Number of Lunches Ordered
Monday	75
Tuesday	25
Wednesday	50
Thursday	100
Friday	150

27. a. Look at the grid in the answer space for question 27 in your Student Answer Booklet. Using this grid, draw a BAR GRAPH to show the school lunch data. Be sure to correctly label your graph.
- b. After studying your graph, write two different possible reasons for Friday's lunch count.

Reporting Category/Substrand for Item 27: Statistics and Probability/NA (p. 120)

Session 2, Short-answer Questions

28. Compute:

$$\begin{array}{r} 3,972 \\ 4,826 \\ +8,321 \\ \hline \end{array}$$

Correct Answers: 17119 or 17,119

Reporting Category/Substrand for Item 28: *Number Sense/Whole Number Computation (p. 118)*

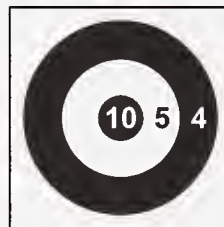
29. Compute:

$$789 \div 9 =$$

Correct Answers (any of the following):
87R6, 87.6, 87.7, $87\frac{2}{3}$, or $87\frac{6}{9}$

Reporting Category/Substrand for Item 29: *Number Sense/Whole Number Computation (p. 118)*

Use the target pictured below to answer question 30.



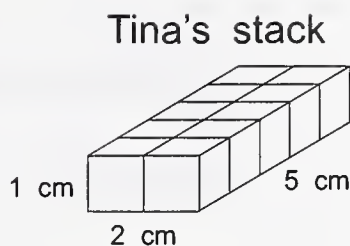
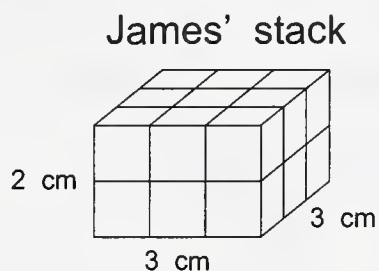
30. Teri tossed bean bags at this target. She scored 29 points in the FEWEST possible number of tosses. Write a number sentence that shows the sum of points Teri scored in each of these tosses.

Correct Answers (any of the following or their equivalents):
 $10 + 10 + 5 + 4 = 29$
 $10(2) + 5 + 4 = 29$
 $10 + 10 + 5 + 4 = n = 29$

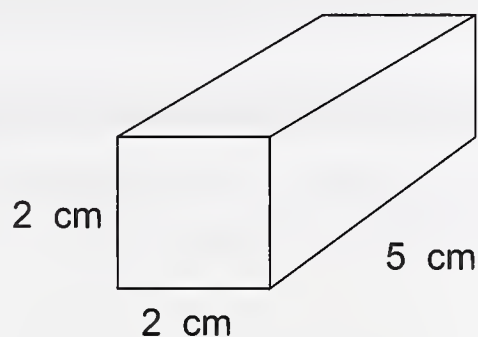
Reporting Category/Substrand for Item 30: *Patterns, Relations, and Functions/Algebra/Mathematical Structures (p. 119)*

Session 2, Open-response Question

31. James and Tina made these stacks of centimeter cubes.



- Whose stack has more centimeter cubes? Explain or show how you know you are right.
- Another student named Amanda has 20 centimeter cubes in all. She has found the box shown below.

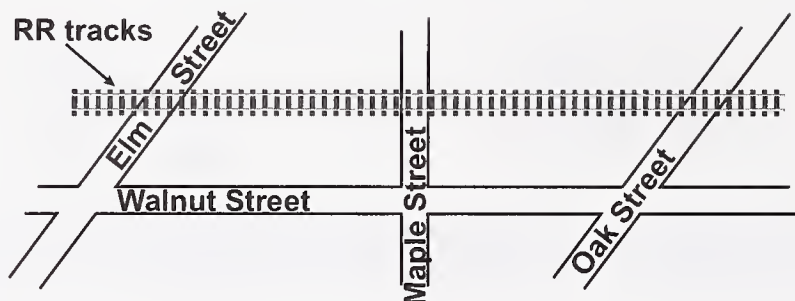


Will this box hold her 20 centimeter cubes? Explain why it WILL or WILL NOT hold 20 centimeter cubes.

Reporting Category/Substrand for Item 31: *Geometry and Measurement/Measurement (p. 120)*

Session 2, Multiple-choice Questions

Use the picture below to answer question 32.



32. Which street is parallel to the railroad tracks?

- A. Oak Street
- ✓ B. Walnut Street
- C. Maple Street
- D. Elm Street

Reporting Category/Substrand for Item 32: **Geometry and Measurement/Geometry and Spatial Sense (p. 119)**

33. Shawn spent \$8.69 to have his watch repaired and \$2.15 on library fines. Which is the BEST ESTIMATE of the amount of money he spent?

- A. about \$9
- B. about \$10
- ✓ C. about \$11
- D. about \$12

Reporting Category/Substrand for Item 33: **Number Sense/Estimation (p. 118)**

34. A coin is flipped six times. The results are heads, tails, heads, tails, tails, and tails. If the coin is tossed again, what is the chance that the result will be tails?

- A. 0 chance
- ✓ B. 1 out of 2
- C. 1 out of 3
- D. 2 out of 2

Reporting Category/Substrand for Item 34: **Statistics and Probability/NA (p. 120)**

35. What number belongs in each shape to make both of the following number sentences true?

$$\bigcirc \times \bigcirc = 36$$

$$\bigcirc + \square = 13$$

- ✓ A. $\bigcirc = 6$
 $\square = 7$
- B. $\bigcirc = 8$
 $\square = 5$
- C. $\bigcirc = 7$
 $\square = 6$
- D. $\bigcirc = 9$
 $\square = 4$

Reporting Category/Substrand for Item 35: *Patterns, Relations, and Functions/Algebra/Mathematical Structures* (p. 119)

36. Which numeral represents 1 ten, 7 ones, and 9 tenths?

- A. 0.179
- B. 1.79
- ✓ C. 17.9
- D. 179.0

Reporting Category/Substrand for Item 36: *Number Sense/Fractions and Decimals* (p. 118)

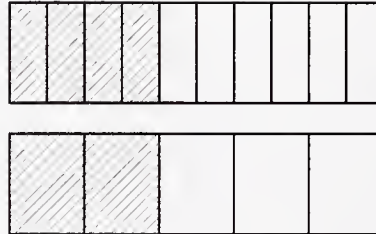
37. How could Haley check this division problem?

$$\begin{array}{r} 329 \text{ R}2 \\ 8 \overline{) 2634} \end{array}$$

- A. Multiply 2634 by 2; then add 8.
- ✓ B. Multiply 8 by 329; then add 2.
- C. Divide 8 by 329; then add 2.
- D. Divide 329 by 2; then add 8.

Reporting Category/Substrand for Item 37: *Number Sense/Concepts of Whole Number Operations* (p. 118)

Use the diagram below to answer question 38.

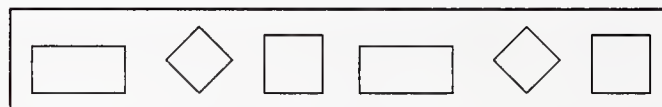


38. $\frac{4}{10} = \frac{\square}{\square}$

- A. $\frac{1}{5}$
- ✓ B. $\frac{2}{5}$
- C. $\frac{3}{5}$
- D. $\frac{4}{5}$

Reporting Category/Substrand for Item 38: **Number Sense/Fractions and Decimals** (p. 118)

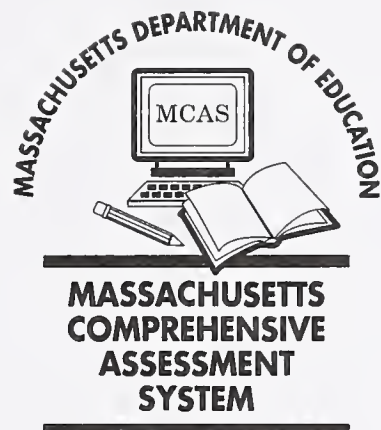
Use the pattern in the box below to answer question 39.



39. What are the next four figures in the pattern above?

- ✓ A.
- B.
- C.
- D.

Reporting Category/Substrand for Item 39: **Patterns, Relations, and Functions/Patterns and Relationships** (p. 119)



VI. Mathematics, Grade 8

Massachusetts Department of Education

Curriculum Framework *Learning Standards/*

MCAS Reporting Categories

Mathematics, Grade 8

The 1999 MCAS Mathematics test was based on the learning standards of the Massachusetts *Mathematics Curriculum Framework*.¹⁶ The *Framework* identifies four major content strands, which also serve as MCAS reporting categories:¹⁷

- Number Sense
- Patterns, Relations, and Functions
- Geometry and Measurement
- Statistics and Probability

At grade 8, the *Framework* divides each strand into multiple substrands. These substrands are specifically referenced as one tool for interpreting school and district results in the MCAS document, *Guide to Interpreting the Spring 1999 MCAS Reports for Schools and Districts*, due for release later in 1999. Learning standards are grouped below by both reporting category and substrand headings, and are directly quoted from the *Framework*; applicable *Framework* page numbers are given in parentheses following the headings.

Each common item in the second section of this chapter is followed by a reference to the reporting category and substrand that contain the learning standard(s) to which the item is related.

Number Sense

Number and Number Relationships (*Framework*, p. 40)

Students engage in problem solving, communicating, reasoning, and connecting to

- represent and use equivalent forms of numbers, including integers, fractions, decimals, percents, exponents, and scientific notation.
- apply ratios, proportions, and percents.
- investigate and describe the relationships among fractions, decimals, and percents.
- represent numerical relationships in one- and two-dimensional graphs.

¹⁶ Massachusetts Department of Education, *Mathematics Curriculum Framework: Achieving Mathematical Power* (Malden, 1996).

¹⁷ Please note that these MCAS reporting categories differ from those used in the 1998 MCAS reports to school and districts. The 1998 MCAS reporting categories are referenced as substrands in this chapter.

Number Systems and Number Theory (*Framework*, p. 41)

Students engage in problem solving, communicating, reasoning, and connecting to

- explain the need for numbers other than whole numbers.
- know and use order relations for whole numbers, fractions, decimals, integers, and rational numbers.
- use operations involving fractions, decimals, integers, and rational numbers.
- demonstrate how basic operations are related to one another.
- create and apply number theory concepts, including prime numbers, factors, and multiples.

Computation and Estimation (*Framework*, p. 42)¹⁸

Students engage in problem solving, communicating, reasoning, and connecting to

- compute with whole numbers, fractions, decimals, integers, and rational numbers.
- develop, analyze, and explain procedures for computing, estimating, and solving proportions.
- select and use an appropriate method for computing from among mental arithmetic, paper-and-pencil, calculator, and computer methods.
- use computation, estimation, and proportions to solve problems.
- estimate to check the reasonableness of results of computations and problems involving rational numbers.

Ratio, Proportion, Percent (*Framework*, p. 42)¹⁹

Students engage in problem solving, communicating, reasoning, and connecting to

- compute with whole numbers, fractions, decimals, integers, and rational numbers.
- develop, analyze, and explain procedures for computing, estimating, and solving proportions.
- select and use an appropriate method for computing from among mental arithmetic, paper-and-pencil, calculator, and computer methods.
- use computation, estimation, and proportions to solve problems.
- estimate to check the reasonableness of results of computations and problems involving rational numbers.

¹⁸ The *Mathematics Curriculum Framework* substrand, *Computation and Estimation*, has been divided into two subcategories for grade 8: *Computation and Estimation* and *Ratio, Proportion, Percent*. See the MCAS document, *Guide to the Massachusetts Comprehensive Assessment System: Mathematics*, pages 67 and 71, for further information about the different assessment expectations for these two subcategories.

¹⁹ See note 18.

Patterns, Relations, and Functions

Patterns and Functions (*Framework*, p. 60)

Students engage in problem solving, communicating, reasoning, and connecting to

- describe, extend, analyze, and create a wide variety of patterns.
- describe and represent relationships with models, tables, graphs, and rules, using sentences and algebraic expressions.
- analyze functional relationships to explain how a change in one quantity results in a change in another.
- use patterns and functions to represent and solve problems.

Algebra (*Framework*, p. 61)

Students engage in problem solving, communicating, reasoning, and connecting to

- understand and apply the concepts of variable, expression, and equation.
- represent situations and number patterns with tables, graphs, verbal rules, and equations and explore the interrelationships of these representations.
- analyze tables and graphs to identify properties and relationships.
- demonstrate an ability to solve linear equations, using concrete, informal, and formal methods.
- describe the strategies used to explore inequalities and nonlinear equations.
- apply algebraic methods to solve a variety of real-world and theoretical problems.
- construct expressions or equations that model problems.
- explore and describe a variety of ways to solve equations, including hands-on activities, trial and error, and numerical analysis.
- know and apply algebraic procedures for solving equations and inequalities.

Geometry and Measurement

Geometry (*Framework*, p. 75)

Students engage in problem solving, communicating, reasoning, and connecting to

- identify, describe, compare, and classify geometric figures.
- explore and describe the properties of points, lines, and planes.
- visualize and draw geometric figures.
- explore and describe transformations of geometric figures.
- represent and solve problems, using geometric models.
- apply geometric properties and relationships.
- develop and explain the concept of π .
- develop and explain the concept of the Pythagorean theorem.

Measurement (*Framework*, p. 76)²⁰

Students engage in problem solving, communicating, reasoning, and connecting to

- select appropriate units and tools to measure to the degree of accuracy required in a particular situation.
- describe the meaning of perimeter, area, volume, angle measure, capacity, density, weight, and mass.
- develop and describe the concepts of rates and other derived and indirect measurements.
- develop and apply formulas and procedures for determining measures to solve problems.

Geometric Measurement (*Framework*, p. 76)²¹

Students engage in problem solving, communicating, reasoning, and connecting to

- select appropriate units and tools to measure to the degree of accuracy required in a particular situation.

²⁰ The *Mathematics Curriculum Framework* substrand, *Measurement*, has been divided into two subcategories for grade 8: *Measurement* and *Geometric Measurement*. See the MCAS document, *Guide to the Massachusetts Comprehensive Assessment System: Mathematics*, pages 86 and 90, for further information about the different assessment expectations for these two subcategories.

²¹ See note 20.

- describe the meaning of perimeter, area, volume, angle measure, capacity, density, weight, and mass.
- develop and describe the concepts of rates and other derived and indirect measurements.
- develop and apply formulas and procedures for determining measures to solve problems.

Statistics and Probability

Statistics (*Framework*, p. 90)

Students engage in problem solving, communicating, reasoning, and connecting to

- collect, organize, and describe data systematically.
- construct, read, and interpret tables, charts, and graphs.
- make inferences and convincing arguments that are based on data analysis.
- evaluate arguments that are based on data analysis.
- develop and explain why statistical methods are powerful aids for decision making.

Probability (*Framework*, p. 91)

Students engage in problem solving, communicating, reasoning, and connecting to

- model situations by devising and carrying out experiments or simulations to determine probabilities.
- construct a sample space to determine probabilities.
- describe the power of using a probability model by comparing experimental results with mathematical expectations.
- make predictions that are based on experimental or theoretical probabilities and determine their reasonableness.
- develop and explain an appreciation for the pervasive use of probability in the real world.

MCAS Spring 1999 Common Test Items

Mathematics, Grade 8

Test Administration Sessions

Grade 8 MCAS Student Test Booklets contained 3 separate Mathematics test sessions. Each session included multiple-choice and open-response questions. Session 1 also included short-answer questions.

Reference Materials and Tools

During testing, each grade 8 student was provided with a **Mathematics Reference Sheet**. A sample of the Grade 8 Mathematics Reference Sheet is included in Appendix A of this document.

During Sessions 2 and 3, each grade 8 student was allowed to use a personal calculator while answering test questions. If any student could not provide his or her own calculator with at least four functions and a square root key, one was provided to that student for use during those sessions. Calculator use was not allowed during Session 1.

No other reference tools or materials were allowed during any grade 8 Mathematics test session.

Session 1, Multiple-choice Questions

1. Which number is 100 more than 99,999?

- A. 99,099
- B. 100,000
- C. 100,999
- ✓ D. 100,099

*Reporting Category/Substrand for Item 1: **Number Sense/Computation and Estimation** (p. 144)*

2. The regular price of a computer game is \$49.95. Which of the following sale prices would result in the lowest price for the computer game?

- A. \$8 less than the regular price
- B. 20% discount on the regular price
- ✓ C. $\frac{1}{4}$ reduction on the regular price
- D. 85% of the regular price

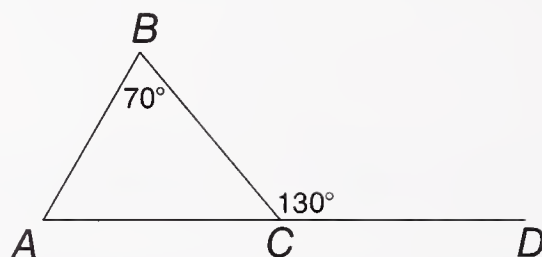
*Reporting Category/Substrand for Item 2: **Number Sense/Number and Number Relationships** (p. 143)*

3. The product of $\frac{9}{10}$ and $\frac{8}{9}$ is

- ✓ A. between 0 and 1.
- B. between 1 and 2.
- C. between 2 and 3.
- D. greater than 3.

*Reporting Category/Substrand for Item 3: **Number Sense/Computation and Estimation** (p. 144)*

Use the figure below to answer question 4.



4. What is the measure of $\angle A$?

- ✓ A. 60°
- B. 120°
- C. 50°
- D. 130°

Reporting Category/Substrand for Item 4: *Geometry and Measurement/Geometry* (p. 146)

5. A pair of jeans is on sale for \$15.50. The original price was \$23.95. Which is the best estimate of the discount?

- A. $\frac{1}{2}$ off
- ✓ B. $\frac{1}{3}$ off
- C. $\frac{1}{4}$ off
- D. $\frac{1}{5}$ off

Reporting Category/Substrand for Item 5: *Number Sense/Computation and Estimation* (p. 144)

Session 1, Short-answer Questions

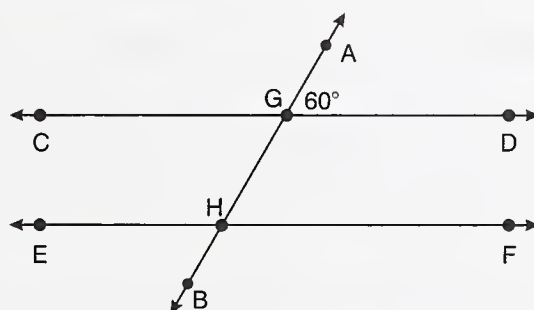
6. What does x equal in this equation?

$$x + 4 = 2$$

Correct Answers: -2 or $x = -2$

Reporting Category/Substrand for Item 6: **Patterns, Relations, and Functions/Algebra** (p. 145)

Use the following figure to answer question 7.



7. In the figure above, lines CD and EF are parallel. What is the measure, in degrees, of $\angle BHF$?

Correct Answer: 120°

Reporting Category/Substrand for Item 7: **Geometry and Measurement/Geometry** (p. 146)

Session 1, Open-response Question

8. Terri and Nicholas invented a new game called Mix and Match Clues. These are the clues:

Clue A: The number is greater than 150 and less than 200.

Clue B: The number is evenly divisible by 3.

Clue C: The number is evenly divisible by 5.

Clue D: The number is evenly divisible by 2.

Clue E: The number is a prime number.

- a. If possible, write a number that fits Clues A and B. If it is not possible, tell why.
- b. If possible, write a number that fits Clues A, C, and D. If it is not possible, tell why.
- c. If possible, write a number that fits Clues A, B, C, and D. If it is not possible, tell why.
- d. If possible, write a number that fits Clues A, B, and E. If it is not possible, tell why.

*Reporting Category/Substrand for Item 8: **Number Sense/Number Systems and Number Theory (p. 144)***

Session 1, Short-answer Questions

9. When 7 is subtracted from a number four times, the result is 3. What is the number?

Correct Answer: 31

Reporting Category/Substrand for Item 9: Number Sense/Number Systems and Number Theory (p. 144)

10. What does x equal in this equation?

$$\frac{x}{4} + 8 = 32$$

Correct Answer: 96

Reporting Category/Substrand for Item 10: Patterns, Relations, and Functions/Algebra (p. 145)

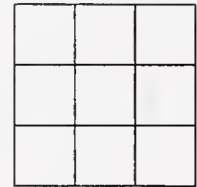
11. How many units apart are -6 and 4 on the number line?


Correct Answers: 10 or 10 units

Reporting Category/Substrand for Item 11: Number Sense/Number and Number Relationships (p. 143)

Session 1, Open-response Question

12. At first glance, a person might see only 9 squares in the figure to the right. However, there are actually 14 squares.



There are 9 small squares , 4 medium-sized squares ,

and one large square .

Look at this pattern of rectangular figures.



Figure 1



Figure 2



Figure 3



Figure 4

- How many rectangles are there in Figure 1?
- How many rectangles are there in Figure 2?
- How many rectangles are there in Figure 3?
- How many rectangles are there in Figure 4?
- Look for a pattern in your answers for parts a through d. Predict the number of rectangles in the 7th figure, that is, in the figure made up of 7 small congruent rectangles.
- Write an expression for the number of rectangles in the n th figure, that is, in the figure made up of n small congruent rectangles.

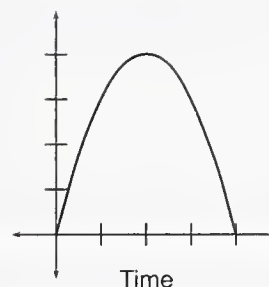
Reporting Category/Substrand for Item 12: *Patterns, Relations, and Functions/Patterns and Functions (p. 145)*

Session 2, Multiple-choice Questions

Use the graph to answer question 13.

13. Which of the following could be shown by the graph?

- A. the height of a candle as it burns over time
- ✓ B. the height of a ball thrown straight upward over time
- C. the distance covered by a car traveling at a constant speed over time
- D. the height of water in a tank being drained at a constant rate over time



Reporting Category/Substrand for Item 13: **Patterns, Relations, and Functions/Patterns and Functions (p. 145)**

14. Which of the following **best** describes the meaning of π ?

- A. the measurement of the circumference of a circle
- B. the measurement of the diameter of a circle
- ✓ C. the ratio of the circumference of a circle to its diameter
- D. the ratio of the area of a circle to its circumference

Reporting Category/Substrand for Item 14: **Geometry and Measurement/Geometry (p. 146)**

15. Luis is going to toss two coins. What is the probability that he will toss one head and one tail?

- A. $\frac{1}{4}$
- B. $\frac{1}{3}$
- ✓ C. $\frac{1}{2}$
- D. $\frac{3}{4}$

Reporting Category/Substrand for Item 15: **Statistics and Probability/Probability (p. 147)**

16. The following equation shows the relationship between a distance traveled (d), the time traveled (t), and the rate (r):

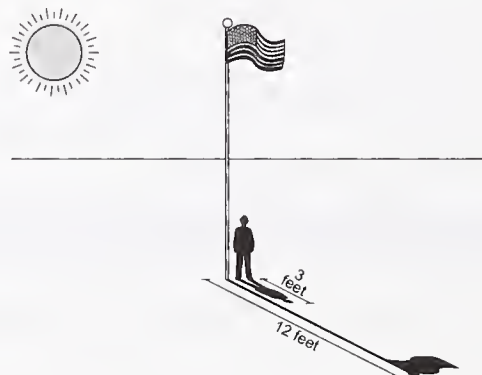
$$\frac{d}{t} = r$$

If the time t increases and the distance d remains the same, what happens to the rate r ?

- A. It increases.
- ✓ B. It decreases.
- C. It remains the same.
- D. There is not enough information given to tell.

Reporting Category/Substrand for Item 16: **Patterns, Relations, and Functions/Algebra** (p. 145)

17. Kevin is standing next to the school's flagpole on a sunny day as shown in the diagram below.



Kevin is 5 feet tall. Which proportion could you use to find the height of the flagpole?

- ✓ A. $\frac{3}{5} = \frac{12}{x}$
- B. $\frac{3}{x} = \frac{5}{12}$
- C. $\frac{3}{12} = \frac{x}{5}$
- D. $\frac{3}{5} = \frac{x}{12}$

Reporting Category/Substrand for Item 17: **Number Sense/Number and Number Relationships** (p. 143)

Use the chart below to answer question 18.

Number of Band Members			
	Grade 6	Grade 7	Grade 8
Number	18	26	42

18. If a band member is chosen at random to represent the band at a parent-teacher meeting, which is the best estimate of the probability that an eighth grader will be chosen?

- A. 33%
- ✓ B. 50%
- C. 67%
- D. 85%

Reporting Category/Substrand for Item 18: **Statistics and Probability/Probability** (p. 147)

19. A principal appointed a committee to decorate a row of lockers numbered 1 to 150. The committee decided to put

- a flower sticker on each 4th locker beginning with locker 4,
- a red band of color on each 10th locker beginning with locker 10, and
- a balloon sticker on each 15th locker beginning with locker 15.

How many lockers got all three decorations?

- ✓ A. 2
- B. 6
- C. 4
- D. none

Reporting Category/Substrand for Item 19: **Number Sense/Number Systems and Number Theory** (p. 144)

20. Of the 640 students in a school, 428 were born in Massachusetts. If a newspaper reporter interviews one student at random, which is the best estimate of the probability that the student was born in Massachusetts?

A. $\frac{1}{2}$

✓ B. $\frac{2}{3}$

C. $\frac{2}{1}$

D. $\frac{3}{2}$

Reporting Category/Substrand for Item 20: Statistics and Probability/Probability (p. 147)

21. Jake read in the newspaper that one U.S. dollar was worth \$1.37 in Canadian money. If n stands for a number of U.S. dollars, which equation gives the value, v , of those dollars in Canadian money?

A. $v = n + 1.37$

B. $v = n - 1.37$

C. $v = \frac{n}{1.37}$

✓ D. $v = 1.37n$

Reporting Category/Substrand for Item 21: Patterns, Relations, and Functions/Algebra (p. 145)

22. The area of square A is 4 square units. The sides of square B are twice as long as the sides of square A. What is the area of square B?

A. 8 square units

B. 64 square units

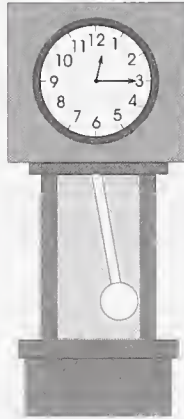
C. 32 square units

✓ D. 16 square units

Reporting Category/Substrand for Item 22: Geometry and Measurement/Geometric Measurement (pp. 146-147)

Session 2, Open-response Question

23. Galileo discovered that there is a relationship between the time it takes for a clock pendulum to swing back and forth and the length of the pendulum.







Time of Swing	Length of Pendulum
1 second	1 unit
2 seconds	4 units
3 seconds	9 units
4 seconds	16 units

- According to the pattern shown in the table, what would be the length of the pendulum if the swing took 6 seconds?
- On the grid in your Student Answer Booklet, draw a graph from this data to show the relationship between the time of the swing and the length of the pendulum.
- Describe how the length of the pendulum can be calculated for swings of up to 12 seconds.
- Write an equation that shows the relationship between the pendulum length, l , and the number of seconds, t , of the swing.

Reporting Category/Substrand for Item 23: *Patterns, Relations, and Functions*/Patterns and Functions (p. 145)

Session 3, Multiple-choice Questions

24. Which of the following patterns could be folded to form a square pyramid?

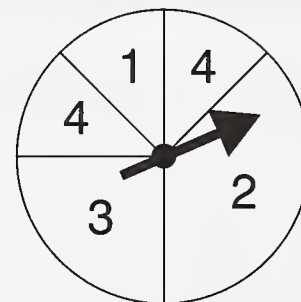
- A. 
- B. 
- C. 
- ✓ D. 

Reporting Category/Substrand for Item 24: *Geometry and Measurement/Geometry* (p. 146)

Use the spinner shown to answer question 25.

25. What is the probability of spinning an odd number on this spinner?

- A. $\frac{1}{2}$
- ✓ B. $\frac{3}{8}$
- C. $\frac{1}{4}$
- D. $\frac{2}{5}$



Reporting Category/Substrand for Item 25: *Statistics and Probability/Probability* (p. 147)

26. A triangle is a right triangle if the lengths, a , b , and c , of its three sides satisfy the following equation:

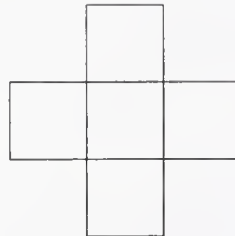
$$a^2 + b^2 = c^2$$

Which of the following is a right triangle?

- A. a triangle with sides measuring 13, 15, and 19
- B. a triangle with sides measuring 17, 25, and 36
- ✓ C. a triangle with sides measuring 20, 21, and 29
- D. a triangle with sides measuring 18, 23, and 41

Reporting Category/Substrand for Item 26: *Patterns, Relations, and Functions/Algebra* (p. 145)

Use the figure below to answer question 27.



27. The area of each square in the figure is 16 square units. What is the perimeter of the figure?

- A. 32 units
- B. 16 units
- ✓ C. 48 units
- D. 64 units

Reporting Category/Substrand for Item 27: **Geometry and Measurement/Geometric Measurement (pp. 146-147)**

28. A large jar holds about 2,000 jelly beans. Ms. Lee emptied bags of jelly beans into the jar until it was filled. There were 5 bags left over. She challenged the class to estimate the number of red jelly beans in the big jar. The students counted the jelly beans in 5 unused bags. This is what they found.

Bag	1	2	3	4	5
Number of Red Jelly Beans	18	17	18	17	19
Total Number of Jelly Beans	129	115	121	132	124

Which number below best estimates the number of red jelly beans in the big jar?

- ✓ A. 275
- B. 225
- C. 175
- D. 150

Reporting Category/Substrand for Item 28: **Statistics and Probability/Statistics (p. 147)**

29. Which is based on the following rule?

First, square the input number.
Then subtract the input number from its square.

- A.

Input (x)	1	2	5
Output (y)	1	4	20
- B.

Input (x)	1	2	5
Output (y)	0	4	25
- C.

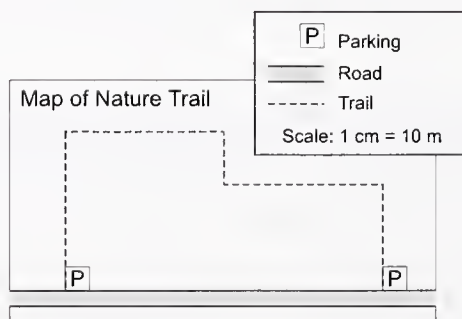
Input (x)	1	2	5
Output (y)	1	2	25
- ✓ D.

Input (x)	1	2	5
Output (y)	0	2	20

Reporting Category/Substrand for Item 29: **Patterns, Relations, and Functions/Patterns and Functions (p. 145)**

Use the ruler on your Mathematics Reference Sheet to answer question 30. [Ed. Note: This graphic is presented in Appendix A in the same dimensions in which it was presented in Student Test Booklets.]

30. Forest rangers are planning to put wooden planks end to end along a nature trail shown on the map below. The planks are each two meters long.

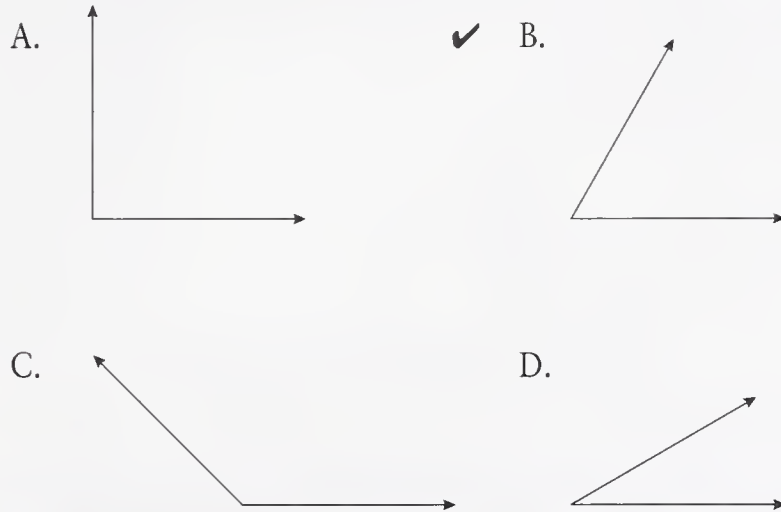


About how many planks will the rangers need for the trail?

- A. 6
- B. 24
- ✓ C. 60
- D. 240

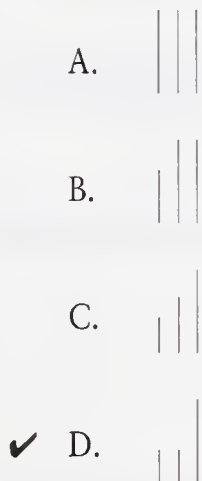
Reporting Category/Substrand for Item 30: **Number Sense/Ratio, Proportion, Percent (p. 144)**

31. Which of the following angles measures about 60° ?



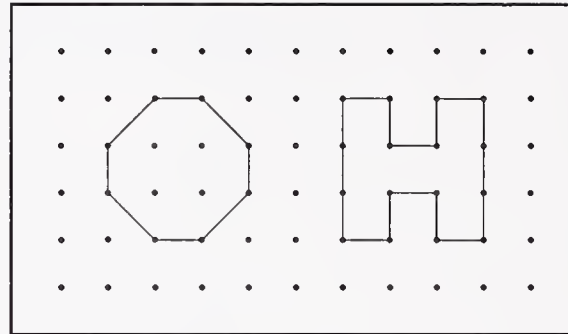
Reporting Category/Substrand for Item 31: *Geometry and Measurement/Geometric Measurement* (pp. 146-147)

32. Which set of line segments **cannot** be used to form a triangle?



Reporting Category/Substrand for Item 32: *Geometry and Measurement/Geometry* (p. 146)

Use the diagram below to answer question 33.



33. Which statement is true about the two polygons?

- ✓ A. They have equal areas but different perimeters.
- B. They have equal perimeters but different areas.
- C. They have equal areas and equal perimeters.
- D. They have different areas and different perimeters.

Reporting Category/Substrand for Item 33: **Geometry and Measurement/Geometric Measurement (pp. 146-147)**

34. So far this term, Heidi has these scores on quizzes.

87, 86, 96, 87

What is the lowest score she can get on the one remaining quiz to have a final average (mean) score of 90?

- ✓ A. 94
- B. 97
- C. 90
- D. 91

Reporting Category/Substrand for Item 34: **Statistics and Probability/Statistics (p. 147)**

35. Maria recently traveled from home to her cousin's house. She constructed this graph showing the relationship between her travel time and the distance she traveled.



Which of the following best describes her trip?

- ✓ A. Maria drove slowly on a dirt road. She stopped for lunch just before getting onto a high-speed superhighway for the rest of her trip.
- B. Maria drove on a high-speed superhighway, then slowly on a dirt road, and finished her trip on a high-speed superhighway.
- C. Maria started on a high-speed superhighway. She stopped for lunch just before getting onto a dirt road for the rest of her trip.
- D. Maria drove slowly on a dirt road, then on a high-speed superhighway, and finished her trip on a dirt road.

*Reporting Category/Substrand for Item 35: **Patterns, Relations, and Functions**/Patterns and Functions (p. 145)*

Use the picture to answer question 36.

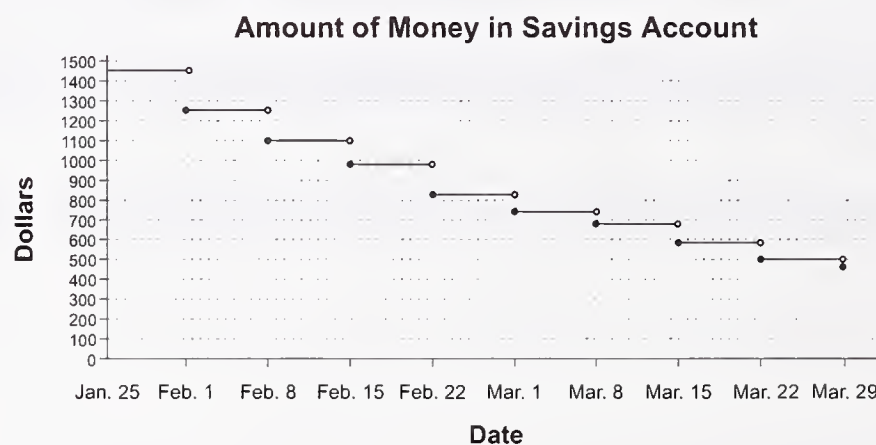
36. Marc wants to put this picture in the school newspaper in a space that is 5 inches tall. If he enlarges the picture proportionally so it is 5 inches tall, how wide will it be?

- A. $3\frac{3}{4}$ in.
 B. $2\frac{3}{4}$ in.
 C. $3\frac{1}{2}$ in.
 ✓ D. $2\frac{1}{2}$ in.



Reporting Category/Substrand for Item 36: **Number Sense/Ratio, Proportion, Percent (p. 144)**

37. On January 25, the treasurer of the Sports Club opened a savings account for the club. The following graph shows the amount of money in the club's account during February and March.

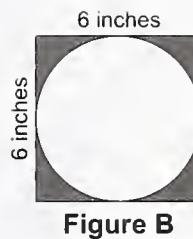
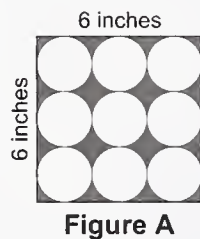


- Based on the information in the graph, which of the following statements is true?
- A. More than half of the money was taken out of the account during February.
 B. More than half of the money was taken out of the account during March.
 ✓ C. More money was taken out of the account each week during February than each week during March.
 D. More money was taken out of the account each week during March than each week during February.

Reporting Category/Substrand for Item 37: **Statistics and Probability/Statistics (p. 147)**

Session 3, Open-response Questions

Use the figures below to answer question 38.



38. Micah thinks that the shaded part of Figure A has a greater area than the shaded part of Figure B. Tonya thinks that the shaded part of Figure B has a greater area than the shaded part of Figure A.

Write a note to Micah and Tonya telling whether either of them is right. Explain in detail the calculations you made to compare the areas of the shaded parts of Figures A and B.

Reporting Category/Substrand for Item 38: Geometry and Measurement/Geometric Measurement (pp. 146-147)

39. Nicholas has saved \$31 to buy a \$50 jacket at Discount City. He has just seen this ad in the newspaper.

COME TO
DISCOUNT CITY
ON SATURDAY! 9A.M. – 5P.M.

Super Sale
on all
Jackets!
Only while supply lasts!

This is how the sale works –

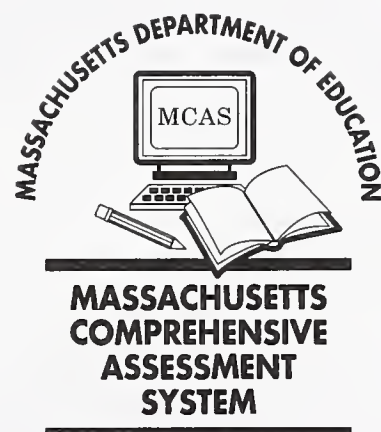
- At 9:00 A.M. every jacket will be 10% off regular price.
- Every hour from 10:00 A.M. until 3:00 P.M., every jacket will be marked down 10% from the previous hour's price.

But don't wait TOO long. Your favorite jacket may be sold out!!

Nicholas wonders how long he will have to wait for a chance to buy the \$50 jacket with the \$31 he has saved.

- Find the price of the \$50 jacket at each hour from 9:00 A.M., when the first 10% discount is applied, until he can afford the jacket. Show or describe how you found the prices.
- On the grid in your Student Answer Booklet, construct a graph for Nicholas showing him the price of the \$50 jacket each hour from 9:00 A.M. until he can afford the jacket. Be sure that your graph is properly labeled.

Reporting Category/Substrand for Item 39: Statistics and Probability/Statistics (p. 147)



VI. Mathematics, Grade 10

Massachusetts Department of Education

Curriculum Framework *Learning Standards/*

MCAS Reporting Categories

Mathematics, Grade 10

The 1999 MCAS Mathematics test was based on the learning standards of the Massachusetts *Mathematics Curriculum Framework*.²² The *Framework* identifies four major content strands, which also serve as MCAS reporting categories:²³

- Number Sense
- Patterns, Relations, and Functions
- Geometry and Measurement
- Statistics and Probability

At grade 10, the *Framework* divides each strand into multiple substrands. These substrands are specifically referenced as one tool for interpreting school and district results in the MCAS document, *Guide to Interpreting the Spring 1999 MCAS Reports for Schools and Districts*, due for release later in 1999. Learning standards are grouped below by both reporting category and substrand headings, and are directly quoted from the *Framework*; applicable *Framework* page numbers are given in parentheses following the headings.

Each common item in the second section of this chapter is followed by a reference to the reporting category and substrand that contain the learning standard(s) to which the item is related.

Number Sense

Discrete Mathematics (*Framework*, p. 44)

Students engage in problem solving, communicating, reasoning, and connecting to

- represent problem situations, using discrete structures such as finite graphs, matrices, sequences, and recurrence relations.
- represent and analyze finite graphs, using matrices.

Mathematical Structure (*Framework*, p. 45)

Students engage in problem solving, communicating, reasoning, and connecting to

- compare and contrast the real number system and its subsystems with regard to structural characteristics.
- demonstrate the logic of algebraic procedures and their interrelationship with geometric ideas and concepts.

²² Massachusetts Department of Education, *Mathematics Curriculum Framework: Achieving Mathematical Power* (Malden, 1996).

²³ Please note that these MCAS reporting categories differ from those used in the 1998 MCAS reports to school and districts. The 1998 MCAS reporting categories are referenced as **substrands** in this chapter.

Estimation (*Framework*, p. 46)

Students engage in problem solving, communicating, reasoning, and connecting to

- use estimation strategies to judge the reasonableness of results of computation and problem solving involving real numbers.
- use estimation when making graphs.

Patterns, Relations, and Functions

Algebra (*Framework*, p. 62)

Students engage in problem solving, communicating, reasoning, and connecting to

- formulate problems that involve variable quantities with expressions, equations, and inequalities.
- use tables and graphs as tools to interpret expressions, equations, and inequalities.
- simplify algebraic expressions to solve equations and inequalities.

Functions (*Framework*, p. 63)

Students engage in problem solving, communicating, reasoning, and connecting to

- model real-world phenomena with a variety of functions.
- represent and analyze relationships, using tables, verbal rules, equations, and graphs.
- translate among tabular, symbolic, and graphical representations of functions.

Trigonometry (*Framework*, p. 64)

Students engage in problem solving, communicating, reasoning, and connecting to

- apply trigonometry to problem situations involving right triangles.

Geometry and Measurement

Geometry and Spatial Sense (Framework, p. 78)²⁴

Students engage in problem solving, communicating, reasoning, and connecting to

- interpret and draw three-dimensional objects.
- represent problem situations with geometric models and apply properties of figures.
- classify figures in terms of congruence and similarity and apply these relationships.
- deduce properties of, and relationships between, figures from given assumptions.
- develop and defend conclusions.
- formulate counter examples.
- construct proofs for mathematical assertions, including indirect proofs and proofs by mathematical induction.

Measurement (Framework, p. 78)²⁵

Students engage in problem solving, communicating, reasoning, and connecting to

- represent problem situations with geometric models and apply properties of figures.
- classify figures in terms of congruence and similarity and apply these relationships.
- deduce properties of, and relationships between, figures from given assumptions.

²⁴ The *Mathematics Curriculum Framework* substrand, *Geometry and Spatial Sense*, has been divided into two subcategories for grade 10: *Geometry and Spatial Sense* and *Measurement*. See the MCAS document, *Guide to the Massachusetts Comprehensive Assessment System: Mathematics*, pages 120 and 123, for further information about the different assessment expectations for these two subcategories.

²⁵ See note 24.

Geometry from an Algebraic Perspective (*Framework*, p. 79)

Students engage in problem solving, communicating, reasoning, and connecting to

- translate between synthetic and coordinate representations.
- deduce properties of figures, using transformations and coordinates.
- identify congruent and similar figures, using transformations.
- develop and explain geometric interpretations and applications of slope.

Statistics and Probability

Statistics (*Framework*, p. 94)

Students engage in problem solving, communicating, reasoning, and connecting to

- construct, draw inferences, and reason with charts, tables, and graphs that summarize data from real-world situations.
- use sampling to recognize and describe its role in statistical claims.
- design a statistical experiment to study a problem, conduct the experiment, and interpret and communicate the outcomes.

Probability (*Framework*, p. 95)

Students engage in problem solving, communicating, reasoning, and connecting to

- use simulations to estimate probabilities.
- determine the likelihood of outcomes, using theoretical probabilities.

MCAS Spring 1999 Common Test Items

Mathematics, Grade 10

Test Administration Sessions

Grade 10 MCAS Student Test Booklets contained 3 separate Mathematics test sessions. Each session included multiple-choice and open-response questions. Session 1 also included short-answer questions.

Reference Materials and Tools

During testing, each grade 10 student was provided with a **Mathematics Reference Sheet**. A sample of the Grade 10 Mathematics Reference Sheet is included in Appendix A of this document.

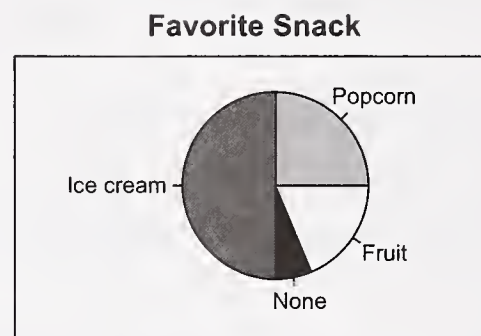
During Sessions 2 and 3, each grade 10 student was allowed to use a personal calculator while answering test questions. If any student could not provide his or her own calculator with at least four functions and a square root key, one was provided to that student for use during those sessions. Calculator use was not allowed during Session 1.

No other reference tools or materials were allowed during any grade 10 Mathematics test session.

Session 1, Multiple-choice Questions

Use the graph that shows the results of a survey to answer question 1.

- Consider a school of 2000 students. Based on the data in the graph, about how many of the 2000 students would you expect to choose fruit as their favorite snack?
 - 750
 - ☒ 400
 - 150
 - 100



Reporting Category/Substrand for Item 1: **Number Sense/Estimation** (p. 172)

- An auto mechanic tries a $\frac{5}{8}$ -inch wrench to loosen a bolt. This wrench almost fits but it is slightly too small. Of the following wrench sizes given in inches, which is the next larger one?
 - $\frac{7}{8}$
 - $\frac{9}{16}$
 - $\frac{3}{4}$
 - ☒ $\frac{11}{16}$

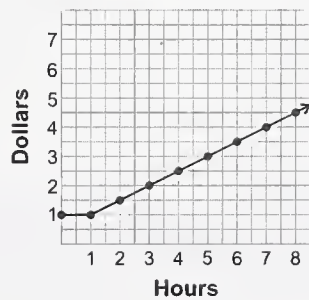
Reporting Category/Substrand for Item 2: **Number Sense/Mathematical Structure** (p. 171)

- Which of the points below is not collinear with the others?
 M (3, -2) N (-5, 6) S (-9, 10) T (10, -21)
 - N only
 - S only
 - ☒ T only
 - They are all collinear.

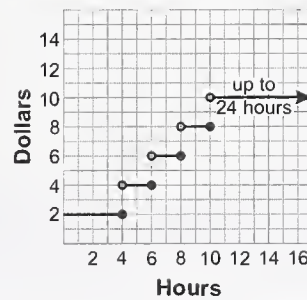
Reporting Category/Substrand for Item 3: **Geometry and Measurement/Geometry and Spatial Sense** (p. 173)

Use the graphs below to answer question 4.

Parking Charges at Pete's Parking
(no maximum charge)



Parking Charges at City Garage

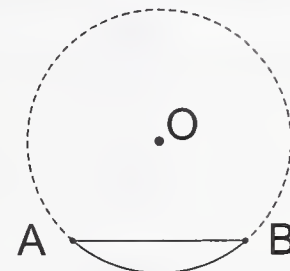


4. Which of the two parking facilities will charge the least for 24 hours of parking?
- ✓ A. City Garage
 - B. Pete's Parking
 - C. They both charge the same.
 - D. 24-hour rates for City Garage are not available.

Reporting Category/Substrand for Item 4: **Patterns, Relations, and Functions/Functions** (p. 172)

Use the figure to answer question 5.

5. The endpoints of the chord of circle O are A and B, two vertices of a triangle. The third vertex, C, can be located anywhere along the dashed arc. If you locate the vertex so that it forms a triangle that has the largest possible area, which of the following **must** be true?



- A. $AB = BC = AC$
- B. $AC < BC$
- C. $AC > BC$
- ✓ D. $AC = BC$

Reporting Category/Substrand for Item 5: **Geometry and Measurement/Geometry and Spatial Sense** (p. 173)

6. Which of the following yields a negative result?

- A. $(-5)^{16}$
- B. $(6 - 9)(-4 + 2)$
- C. $-3(-4)^9$
- ✓ D. -2^9

Reporting Category/Substrand for Item 6: **Number Sense/Mathematical Structure** (p. 171)

Use the figure below to answer question 7.



7. If the above figure is folded into a cube, which of the following solids will be formed?

- A.
- ✓ B.
- C.
- D.

Reporting Category/Substrand for Item 7: **Geometry and Measurement/Geometry and Spatial Sense** (p. 173)

8. The senior class at West High School is about to hold elections for class officers. The list of candidates is shown in the following table.

President	Vice President	Secretary	Treasurer
Leah	Gloria	Andrea	Lance
Mike	Jason	Francis	Sonia
Minh		José	Yosef

How many different slates of officers could be made from the above list if a slate consists of **one** candidate for **each** office?

- A. 4
- B. 11
- C. 18
- ✓ D. 54

Reporting Category/Substrand for Item 8: **Statistics and Probability/Probability** (p. 174)

9. The expression $(\sqrt{16} + 2 \cdot 4^0)^3$ is equal to

- A. 64.
- ✓ B. 216.
- C. 512.
- D. 1000.

Reporting Category/Substrand for Item 9: **Number Sense/Mathematical Structure** (p. 171)

Use the figure below to answer question 10.



10. If the area of the shaded square is 5 cm^2 , what is the perimeter of figure ABCD?

- A. $8\sqrt{5} \text{ cm}$
- B. 40 cm
- ✓ C. $12\sqrt{5} \text{ cm}$
- D. 60 cm

Reporting Category/Substrand for Item 10: *Geometry and Measurement/Measurement* (p. 173)

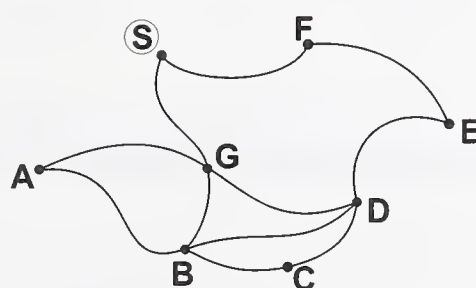
Session 1, Short-answer Questions

11. To earn a grade of B in math, Melvin must achieve an average score of at least 83 on five math tests. His scores on the first three tests are 85, 90, and 80. What is the lowest **total** score that Melvin must have on the last two tests to earn a B test average?

Correct Answer: 160

Reporting Category/Substrand for Item 11: **Statistics and Probability/Statistics (p. 174)**

Use the figure below to answer question 12.



12. The figure shows a map of the points of interest on the Liberty Path. Point S represents the starting and ending point for all tours on the paths between the seven points of interest labeled A through G. Name one tour in which each point of interest is visited exactly once without retracing any path. To name the tour, list the points in the order you would pass through them.

Correct Answers:
SFEDCBAGS or SGABCDEFS

Reporting Category/Substrand for Item 12: **Number Sense/Discrete Mathematics (p. 171)**

Session 1, Open-response Question

13. When playing the game “one-point no-point,” each player rolls one red number cube and one white number cube. Each cube is numbered 1–6.

To win one point all of the following must be true:

- the number on the white cube is greater than 1,
 - the number on the red cube is greater than or equal to 2,
 - the number on the red cube is less than or equal to 5, and
 - the sum of the numbers on the two cubes is less than or equal to 7.
- a. Make a list, graph, or table showing all possible outcomes (sample space) of rolling the red number cube and the white number cube.
- b. What is the probability of winning one point on a roll of the two cubes?
- c. How could you change the last rule to make the probability of winning one point greater than $\frac{1}{2}$?

*Reporting Category/Substrand for Item 13: **Statistics and Probability/Probability** (p. 174)*

Session 1, Short-answer Questions

14. A survey showed that the distribution of blood types among people with a positive Rh factor is the following:

Type O 46%

Type A 39%

Type B 11%

Type AB . . . 4%

If there are 750 students with a positive Rh factor in Martin High School, how many of these students would you expect to have Type O blood?

Correct Answer: 345

Reporting Category/Substrand for Item 14: *Statistics and Probability/Probability* (p. 174)

15. List the rectangles below in order, beginning with the one with the longest diagonal and ending with the one with the shortest diagonal.

Rectangle A: $\sqrt{3}$ by $\sqrt{2}$

Rectangle B: 1 by 3

Rectangle C: $\sqrt{2}$ by 2

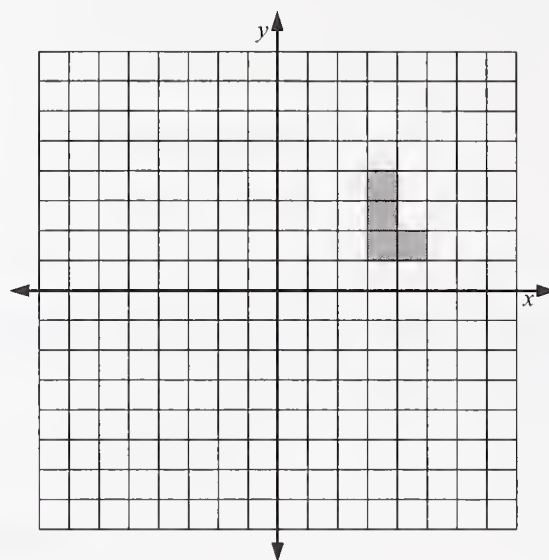
Correct Answers (any of the following three options):

B, C, A	or	1×3	or	$\sqrt{10} = B$
		$\sqrt{2} \times 2$		$\sqrt{6} = C$
		$\sqrt{3} \times \sqrt{2}$		$\sqrt{5} = A$

Reporting Category/Substrand for Item 15: *Geometry and Measurement/Geometry and Spatial Sense* (p. 173)

Session 1, Open-response Question

Use the diagram below to answer question 16.



16. a. On the grid provided in your Student Answer Booklet, copy the diagram shown above. Then transform the shaded “L” in the first quadrant by using the following sequence of steps:

Step I. Reflect the “L” over the x -axis.

Step II. Rotate the result of Step I clockwise 180° about the origin.

Step III. Translate the result of Step II three units up to its final position.

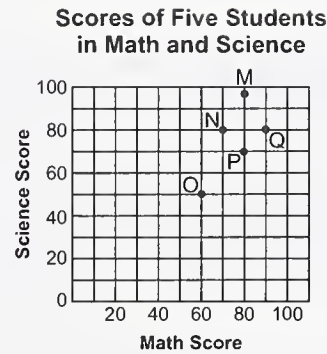
As you transform the shaded “L,” draw and label the image for each of the three steps.

- b. Describe a transformation with fewer than three steps that would achieve the same result as the three steps in part a.

Reporting Category/Substrand for Item 16: **Geometry and Measurement/Geometry and Spatial Sense (p. 173)**

Session 2, Multiple-choice Questions

Use the graph below to answer questions 17 and 18.



17. Which student had the greatest difference in mathematics and science scores?

- ✓ A. M
- B. N
- C. O
- D. P

Reporting Category/Substrand for Item 17: **Statistics and Probability/Statistics (p. 174)**

18. What is the best estimate of the mean of the science test scores for all five students?

- ✓ A. 75
- B. 80
- C. 85
- D. 95

Reporting Category/Substrand for Item 18: **Statistics and Probability/Statistics (p. 174)**

19. The Pizza Palace's price list for plain pizzas is shown below.

DIAMETER	COST
10"	\$5.00
12"	\$7.20
14"	\$9.80
16"	\$12.80

Based on this information, what would a 20" pizza likely cost?

- A. \$10.00
- B. \$14.40
- C. \$14.80
- ✓ D. \$20.00

Reporting Category/Substrand for Item 19: Patterns, Relations, and Functions/Functions (p. 172)

20. Ticket sales at the First Run Theater total at least \$7,600 per week. An adult's ticket costs \$7.50 and a child's ticket costs \$4.00. If a represents the number of adult tickets sold in a week and c represents the number of child tickets, which algebraic sentence represents the money received each week from ticket sales?

- A. $7.50a + 4.00c = 7,600$
- ✓ B. $7.50a + 4.00c \geq 7,600$
- C. $7.50a + 4.00c > 7,600$
- D. $7.50a + 4.00c < 7,600$

Reporting Category/Substrand for Item 20: Patterns, Relations, and Functions/Algebra (p. 172)

Session 2, Open-response Questions

Use the information below to answer question 21.

21. **CD Club #1:** You will receive **four** free CDs for joining the club. You must purchase at least four CDs within the next year at the club price. The club price for each CD is \$11.99.

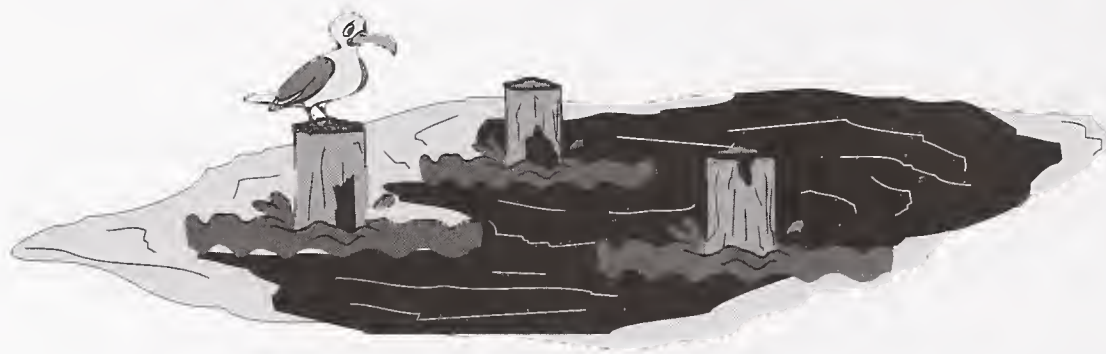
CD Club #2: You will receive **five** free CDs for joining the club. You must purchase at least four CDs within the next year at the club price. The club price for each CD is \$13.99.

- a. Suppose you plan to get a total of nine CDs from one of the clubs by the end of the year.
- What would be the total cost if you got the nine CDs from Club #1?
 - What would be the total cost if you got the nine CDs from Club #2?
- b. Copy and complete the table below in your Student Answer Booklet.

Total number of CDs	Total Cost for Club #1	Total Cost for Club #2
10		
11		
12		

- c. Represent the data from your completed table for the two CD clubs by plotting a graph on the grid in your Student Answer Booklet.
- d. Compare the two offers and explain which is the most economical.

Reporting Category/Substrand for Item 21: Patterns, Relations, and Functions/Algebra (p. 172)



22. A company is hired to clean up an oil spill in a harbor. Each day 10% of the remaining oil can be cleaned from the surface of the water.
- What percent of the oil spill will remain after one clean-up day?
 - What percent of the oil spill will remain after 3 clean-up days? Explain or show how you found your answer.
 - How many clean-up days will it take to remove at least 50% of the oil spill? Explain or show how you found your answer.

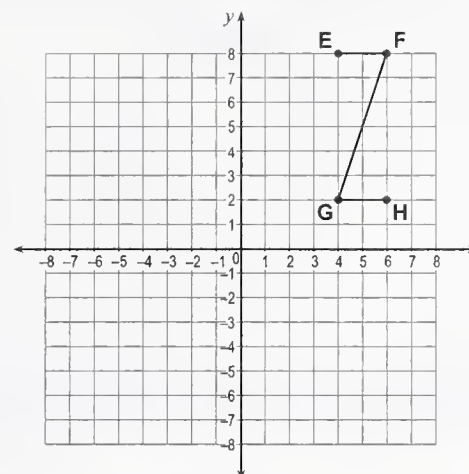
*Reporting Category/Substrand for Item 22: **Number Sense/Discrete Mathematics** (p. 171)*

Session 3, Multiple-choice Questions

Use the diagram to answer question 23.

23. If the figure EFGH is translated 10 units down, what are the new coordinates of the image of point F?

- ✓ A. (6, -2)
- B. (-4, 8)
- C. (8, 6)
- D. (-4, -2)



Reporting Category/Substrand for Item 23: *Geometry and Measurement/Geometry and Spatial Sense (p. 173)*

24. A bag contains 80 marbles that are either white, orange, or green. If 25% are green and there are four times as many white marbles as orange marbles, what percent are white?

- A. 12%
- B. 15%
- C. 48%
- ✓ D. 60%

Reporting Category/Substrand for Item 24: *Patterns, Relations, and Functions/Algebra (p. 172)*

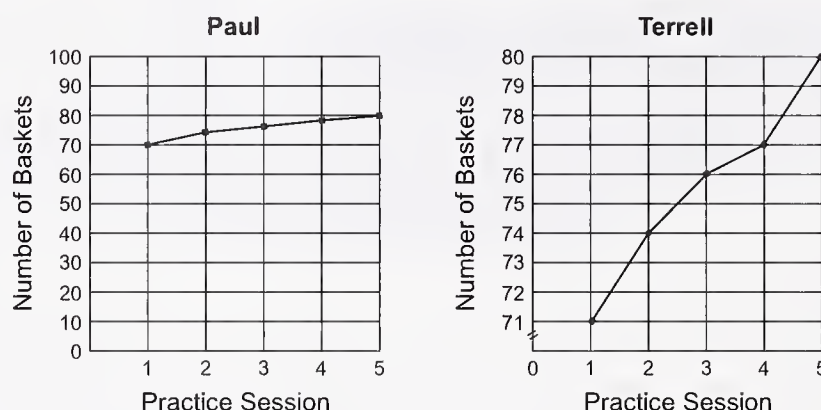
25. Suppose there is a mathematical formula known as Peg's Theorem. In Peg's Theorem, $P = \frac{E}{G}$ for $G \neq 0$. If E remains fixed and G decreases by 50%, then P becomes

- ✓ A. twice as large.
- B. half as large.
- C. the same.
- D. four times as large.

Reporting Category/Substrand for Item 25: *Patterns, Relations, and Functions/Algebra (p. 172)*

Use the graphs below to answer question 26.

Baskets Made During Practice



26. The graphs show numbers of baskets made by Paul and Terrell during 5 basketball practice sessions. They each take 100 practice shots in each practice session. According to the information in these graphs, who was more successful at making baskets?

- A. Paul did much better.
- B. Terrell did much better.
- ✓ C. Their scores appear to be about the same.
- D. More information is needed to make a decision.

Reporting Category/Substrand for Item 26: **Statistics and Probability/Statistics (p. 174)**

27. A manufacturing company has 750 employees. It plans to increase its work force by 15 employees per month until it has doubled in size.

Which of the equations below will help you determine the number of months, m , it will take the company to **double** in size?

- A. $750 + 15 = 2m$
- B. $2(750) = 15m$
- C. $(750 + 15)2 = m$
- ✓ D. $750 + 15m = 2(750)$

Reporting Category/Substrand for Item 27: **Patterns, Relations, and Functions/Algebra (p. 172)**

28. What is the measure of the angle between the minute hand and the hour hand when the time on the clock is 2:30?

- A. 60°
 B. 75°
 ✓ C. 105°
 D. 120°



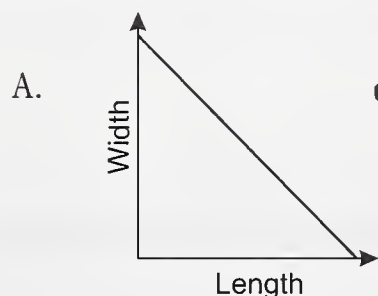
Reporting Category/Substrand for Item 28: *Geometry and Measurement/Geometry and Spatial Sense* (p. 173)

Use the table below to answer question 29.

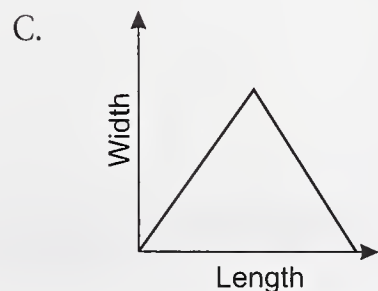
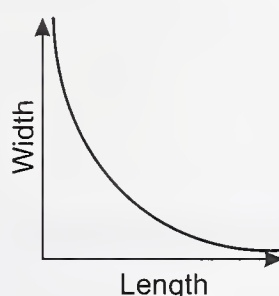
RECTANGLES WITH AREA OF 24 SQUARE UNITS

Length (in units)	1	2	3	4	6	8	12	24
Width (in units)	24	12	8	6	4	3	2	1

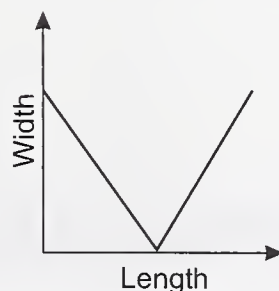
29. Which graph best represents the relationship between the lengths and widths of all rectangles with an area of 24 square units?



✓ B.



D.



Reporting Category/Substrand for Item 29: *Patterns, Relations, and Functions/Functions* (p. 172)

30. Which of these statements about geometric figures is **always** true?

- A. All right triangles are similar.
- B. If two triangles are similar, then they have equal areas.
- ✓ C. If two triangles are congruent, then they have equal areas.
- D. All triangles with equal areas are congruent.

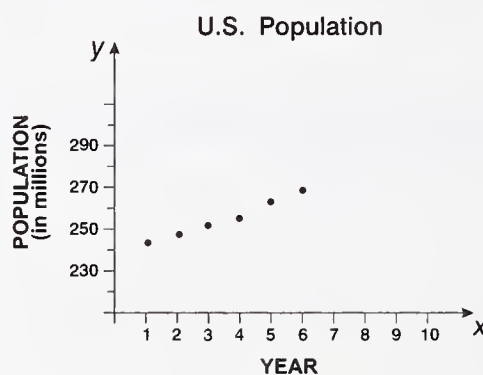
Reporting Category/Substrand for Item 30: **Geometry and Measurement/Geometry and Spatial Sense (p. 173)**

31. If the perimeter of an isosceles triangle is 24 cm, which of the following **cannot** be the base?

- A. 4 cm
- B. 6 cm
- C. 10 cm
- ✓ D. 12 cm

Reporting Category/Substrand for Item 31: **Geometry and Measurement/Geometry and Spatial Sense (p. 173)**

Use the graph below to answer question 32.



32. Which equation could describe the line of best fit for the graph above?

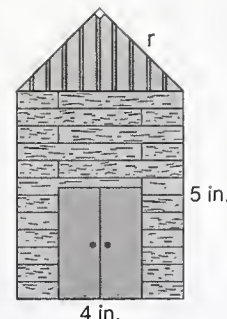
- ✓ A. $y = 5x + 236$
- B. $y = -5x + 236$
- C. $y = \frac{1}{5}x + 236$
- D. $y = -\frac{1}{5}x + 236$

Reporting Category/Substrand for Item 32: **Statistics and Probability/Statistics (p. 174)**

Use the diagram to answer question 33.

33. To the right is a scale drawing of the front view of a shed. The roof of the shed forms an isosceles right triangle. On the scale drawing, the edge of the roof, r , would measure

- A. $\sqrt{2}$ inches.
 ✓ B. $2\sqrt{2}$ inches.
 C. 4 inches.
 D. $4\sqrt{2}$ inches.



Reporting Category/Substrand for Item 33: **Geometry and Measurement/Geometry and Spatial Sense (p. 173)**

Use the table to answer question 34.

34. The number of calculators sold in the school bookstore for the month of September is shown [in the table]. Based on the data shown, what is the probability that the next calculator sold will be a graphing calculator?

Calculators Sold in September

Calculator Type	Number Sold
graphing	15
scientific	28
four function	25
other	12

- A. about 15%
 ✓ B. about 19%
 C. about 23%
 D. about 25%

Reporting Category/Substrand for Item 34: **Statistics and Probability/Probability (p. 174)**

35. If a is a real number and $a^2 < \sqrt{a}$ then

- ✓ A. $0 < a < 1$.
 B. $a < 0$.
 C. $-1 < a < 1$.
 D. $1 < a$.

Reporting Category/Substrand for Item 35: **Number Sense/Mathematical Structure (p. 171)**

36. Which of the following functions will yield the largest value for $x = 50$?

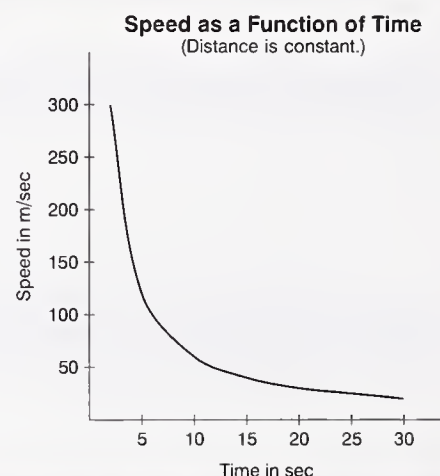
- A. $f(x) = 5 + x$
- B. $f(x) = 5x$
- C. $f(x) = x^2$
- ✓ D. $f(x) = 5^x$

Reporting Category/Substrand for Item 36: **Patterns, Relations, and Functions/Functions** (p. 172)

Use the graph to answer question 37.

37. According to the graph, when the speed of an object is 100 m/sec, then the time is

- A. greater than 300 seconds.
- B. greater than 30 seconds but less than 300 seconds.
- ✓ C. less than 10 seconds but greater than 0 seconds.
- D. 0 seconds.



Reporting Category/Substrand for Item 37: **Number Sense/Estimation** (p. 172)

38. The athletic club is raising money for a class trip. They plan to sell banners with the school's name on them. The cost of each banner is \$3.50 and the printing cost of each is \$0.75. If the club plans on selling each banner for \$11, what is the fewest number of banners that the athletic club needs to sell to make at least a \$500 profit?

- A. 46
- B. 67
- ✓ C. 75
- D. 118

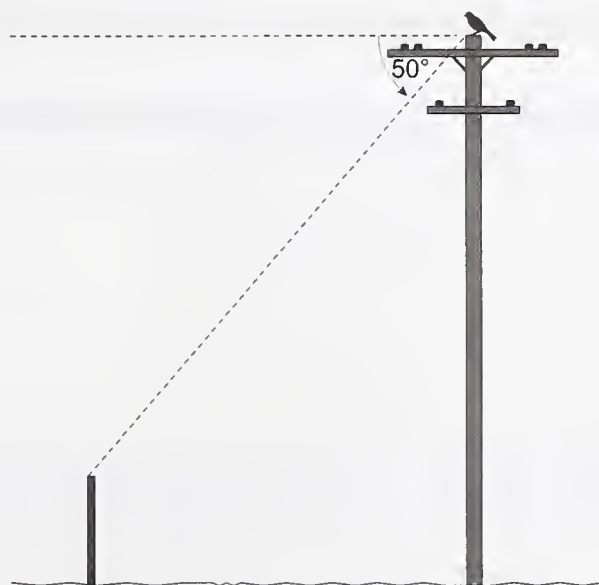
Reporting Category/Substrand for Item 38: **Patterns, Relations, and Functions/Algebra** (p. 172)

39. Which of the following numbers is an irrational number?

- A. $\frac{22}{7}$
- ✓ B. π
- C. $\sqrt{9}$
- D. 3.1416

Reporting Category/Substrand for Item 39: **Number Sense/Mathematical Structure** (p. 171)

Use the diagram below to answer question 40.



40. A bird flies from the top of a 40-ft. utility pole on a straight course to the top of a post eight feet above the ground. If the angle of depression is 50° , how far did the bird fly to reach the post? Round your answer to the nearest tenth. [You may use your calculator or refer to the trigonometry table on the *Mathematics Reference Sheet* to answer this question.]

- ✓ A. 41.8 feet
- B. 49.8 feet
- C. 52.2 feet
- D. 62.2 feet

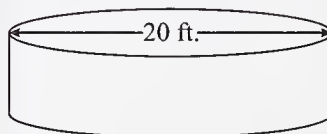
Reporting Category/Substrand for Item 40: **Patterns, Relations, and Functions/Trigonometry** (p. 172)

Session 3, Open-response Questions

41. The number of bacteria in a sample doubles every four hours. At the end of 24 hours there are 30,720 bacteria present in a sample.
- How many bacteria were present initially? Show your work.
 - During which four-hour period will 5 million bacteria first be present? Show your work.
 - Write a mathematical expression to determine the number of bacteria present at the end of any four-hour period.

Reporting Category/Substrand for Item 41: Patterns, Relations, and Functions/Functions (p. 172)

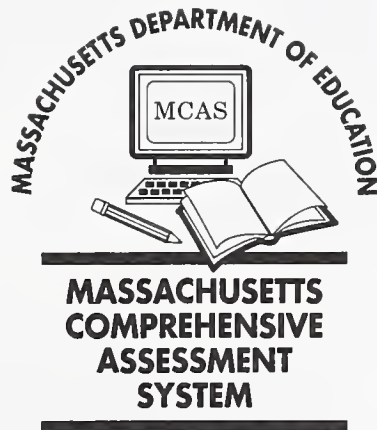
42. Mr. Daniels bought an above-ground cylindrical swimming pool that has a diameter of 20 feet.



He wants to find how long it will take to fill his pool to a depth of 4 feet using his garden hose.

- It takes him 15 seconds to fill a one-gallon jug. What is the rate of flow of the water from the hose in cubic inches per minute? (Note: 1 gal = 231 cubic inches)
- Explain how to convert cubic inches to cubic feet.
- If water is running at the same rate as in part a, how many hours will it take Mr. Daniels to fill his circular swimming pool to a depth of 4 feet? Explain or show how you found your answer.

Reporting Category/Substrand for Item 42: Geometry and Measurement/Measurement (p. 173)



VIII. Science & Technology

Grade 4

Massachusetts Department of Education

Curriculum Framework *Learning Standards/*

MCAS Reporting Categories

Science & Technology, Grade 4

The 1999 MCAS Science & Technology test was based on the learning standards of the Massachusetts *Science & Technology Curriculum Framework*.²⁶ The *Framework* defines four content strands, with three major divisions within the *Domains of Science* strand:

- *Inquiry*
- *Technology*
- *Domains of Science*
 - *Physical Sciences*
 - *Life Sciences*
 - *Earth and Space Sciences*
- *Science, Technology, and Human Affairs*

MCAS results are reported using five similar reporting categories:²⁷

- *Inquiry*
- *Earth and Space Sciences*
- *Physical Sciences*
- *Technology*
- *Life Sciences*

The MCAS *Science & Technology Guide* divides the *Framework*'s content strands (except for *Science, Technology, and Human Affairs*) into multiple subcategories for each grade.²⁸ These MCAS subcategories are specifically referenced as a tool for interpreting school and district results in the MCAS document, *Guide to Interpreting the Spring 1999 MCAS Reports for Schools and Districts*, due for release later in 1999. Each common item in the second section of this chapter is followed by a reference to the MCAS reporting category and subcategory that contain the learning standard(s) to which the item is related.

Learning standards are grouped below by *Framework* content strand and related MCAS subcategory. Applicable *Framework* page numbers are given in brackets following each heading.²⁹

²⁶ Massachusetts Department of Education, *Science & Technology Curriculum Framework: Owning the Questions Through Science & Technology* (Malden, 1996).

²⁷ Please note that these MCAS reporting categories differ from those used in the 1998 MCAS reports to school and districts. The 1998 MCAS reporting categories are referenced as *subcategories* in this chapter.

²⁸ Massachusetts Department of Education, *Guide to the Massachusetts Comprehensive Assessment System: Science & Technology* (Malden, 1998).

²⁹ A very small percentage—less than 1%—of *Science & Technology Curriculum Framework* learning standards that are impractical to test in a large-scale assessment are not tested by MCAS (e.g., at grade 10: “use a range of exploratory techniques, e.g., experiments, information/literature searches, data logging, research and development”). These learning standards are not included in this document.

Inquiry

Classification (*Framework*, p. 27)

Students engage in problem solving, evaluating evidence, searching for connections, and the process of inquiry, in order to

- observe and describe familiar objects and events, identifying details, similarities, and differences.

Designing an Investigation (*Framework*, p. 27)

Students engage in problem solving, evaluating evidence, searching for connections, and the process of inquiry, in order to

- ask questions, both investigable and non-investigable, about the objects and events observed. Suggest ideas about, “how,” “why,” and “what would happen if?”
- make predictions based on past experience with a particular material or object.
- plan and conduct a simple investigation knowing what is to be compared or looked for.

Data Collection, Measurement, and Display (*Framework*, p. 27)

Students engage in problem solving, evaluating evidence, searching for connections, and the process of inquiry, in order to

- extend observations using simple tools, e.g., hand lens, rulers, two-arm balance.
- describe and communicate observations through discussions, drawings, simple graphs, and writing.

Analysis and Interpretation of Data (*Framework*, p. 27)

Students engage in problem solving, evaluating evidence, searching for connections, and the process of inquiry, in order to

- recognize and communicate simple patterns in data.
- describe ideas about “how,” “why,” and “what would happen if?”
- interpret findings by relating one factor to another, e.g., If a ball is dropped from a higher place, will it always bounce higher?

Domains of Science: Physical Sciences

Properties of Matter (*Framework*, p. 44)

Students engage in problem solving, evaluating evidence, searching for connections, and the process of inquiry, in order to

- identify the observable properties of objects such as size, weight, shape, and color.
- give evidence that objects are made up of different materials. Show that properties are useful in describing, grouping, and classifying materials.

- represent an understanding that materials can exist in different states, including solid, liquid, and gaseous, and identify different characteristic properties of materials in each state.
- show and describe how change in a material may be either physical, such as changes in state or appearance, or chemical, such as changes in composition.

Position and Motion of Objects (*Framework*, p. 44)

Students engage in problem solving, evaluating evidence, searching for connections, and the process of inquiry, in order to

- describe the motion of an object in terms of change in position relative to another object or the background.
- experience and describe how an object's motion can be changed through the action of a push or pull on the object.
- demonstrate that sound is produced by vibrating objects.

Energy (*Framework*, p. 45)

Students engage in problem solving, evaluating evidence, searching for connections, and the process of inquiry, in order to

- represent an understanding that the sun supplies heat and light to the Earth.
- manipulate a variety of objects in a beam of light in order to explore conditions in which different objects cast shadows, bend, or transmit light.
- demonstrate that things that give off light may also give off heat.
- investigate situations in which changes in matter also give off energy as light, heat, or sound.
- use qualitative or quantitative measurement to investigate the concept that warmer things put with cooler ones lose heat and the cool ones gain heat, until they are all at the same temperature.
- explore and describe how heat travels more quickly through some materials than others.
- provide evidence that a magnet pulls on all things made of iron and either pushes or pulls on other magnets.
- demonstrate how materials that have been electrically charged may either push or pull other charged materials.
- investigate and describe how light, sound, heat, and sparks can be produced in electrical circuits using batteries as an energy source.

Domains of Science: Life Sciences

Characteristics of Organisms (*Framework, p. 59*)

Students engage in problem solving, evaluating evidence, searching for connections, and the process of inquiry, in order to

- explore and describe that plants and animals are living things and have characteristics that differentiate them from non-living things.
- demonstrate an understanding that plants and animals go through predictable life cycles. These differ from species to species, but all include growth, development, reproduction, and death.
- observe and describe that plants and animals have different structures that serve different functions in growth, survival, and reproduction. These contribute to the well-being of the whole organism, and to the success of its offspring.
- demonstrate awareness that there are millions of kinds of living things on Earth, and that the number of species is not known.

Adaptations, Diversity, and Heredity (*Framework, pp. 59–60*)

Students engage in problem solving, evaluating evidence, searching for connections, and the process of inquiry, in order to

- give examples of how different plants and animals have features that help them thrive in different kinds of places. Recognize that these features may be external or internal (such as warm- or cold-bloodedness), or behavioral.
- identify some kinds of organisms that once lived on earth and that have completely disappeared.
- observe and illustrate ways that individuals of the same kind differ in some of their characteristics, and that sometimes the differences give individuals an advantage in surviving and reproducing.
- compare fossils to one another and to living organisms according to their similarities and differences.
- provide examples of variations as well as similarities among individuals of the same species. Recognize that although it is hard for us to see this, it is true of all kinds of organisms.
- observe and describe that some of the variations within a species are acquired during the individual's lifetime (such as an athlete's muscles, or the ability to play the piano); some were inherited from the individual's parents (such as eye color); some start with inherited tendencies, which develop in individual ways owing to the conditions of the individual's life (such as height and foot-size).

- identify ways that offspring resemble their parents, but are not identical to them. Realize that, in every group of organisms, there is variation in every characteristic.

Organisms and Environments (*Framework*, p. 60)

Students engage in problem solving, evaluating evidence, searching for connections, and the process of inquiry, in order to

- provide evidence that all organisms use some basic chemical building blocks, including water and oxygen. Observe that each kind of organism has special living requirements, and each has its own way to get the energy and nutrients it needs. Observe that green plants can make their own food from sunlight; animals consume plants or other organisms for their food.
- explore and illustrate an understanding that decomposers, which include single-celled organisms and fungi, break down dead plants and animals for food.
- provide examples of living organisms meeting their needs by interacting with living and non-living parts of the environment in which they live.
- observe and demonstrate ways that all organisms effect change in the environment where they live. Recognize that some of these changes are detrimental to themselves and other organisms, whereas others are beneficial. Observe ways that changes in environmental factors, such as humidity, temperature, and light, also affect the organisms in an environment.

Domains of Science: Earth and Space Sciences

Properties of Earth's Materials (*Framework*, p. 74)

Students engage in problem solving, evaluating evidence, searching for connections, and the process of inquiry, in order to

- illustrate that Earth's surface is composed of water, rocks, soils, and living organisms.
- observe and describe that change is something that happens to Earth materials.
- illustrate that some events in nature have a repeating pattern. The weather changes some from day to day, but things such as temperature and precipitation show annual rhythms particular to a geographical area.
- observe and show that air has properties that can be identified and measured, such as wind speed and direction, temperature, moisture, the occurrence of clouds, and the fall of precipitation. Know that together these properties and events for a particular place and time are called the weather.
- explore and demonstrate that rocks are made of minerals.

(continued on next page)

- observe and illustrate that rocks come in many sizes and shapes, from boulders to grains of sand and even smaller.
- show evidence that water flows downhill in streams and rivers, or accumulates in lakes and puddles and seeps into the ground.
- examine and describe ways in which fossils provide evidence of Earth's history, and show how plants, animals, and environments have changed over time.
- illustrate that the interior of Earth is hot. Heat flow and movement of material within the Earth move continents, cause earthquakes and volcanic eruptions, and create mountains and ocean basins.

Objects in the Sky (*Framework*, p. 75)

Students engage in problem solving, evaluating evidence, searching for connections, and the process of inquiry, in order to

- examine and illustrate that Earth is one of several planets that orbit the sun, and that the moon orbits around the Earth.
- describe ways in which the sun, moon, planets, meteors, clouds and other objects in the sky can be identified by properties such as size, shape, color, brightness, and movement.
- represent understanding that the sun provides light and heat.
- observe and explain why the sun can be seen only in the daytime, but the moon can be seen sometimes at night and sometimes during the day. Know that because Earth rotates, the sun, moon, and stars all appear to move slowly across the sky.
- observe and illustrate why the moon looks a little different every day, but looks the same again about every four weeks.

Technology

The Design Process (*Framework*, p. 88)

Students engage in problem solving, evaluating evidence, searching for connections, and the process of inquiry, in order to

- identify a simple current technological problem.
- implement a solution by constructing a device using materials provided.
- evaluate a solution in terms of whether it meets the goals.
- communicate a problem, design, or solution using drawings and words.
- propose ways to improve the solution.

Understanding and Using Technology (*Framework*, pp. 90–91)

Students engage in problem solving, evaluating evidence, searching for connections, and the process of inquiry, in order to

- describe ways in which tools and machines are used to process materials, energy, and information.
- demonstrate use and care of simple tools.
- document that people are always inventing new ways to get things done.
- use a variety of materials such as wood, metal, plastic, fabric, and clay to make simple products.
- identify materials that can be recycled and those that cannot.
- explain that messages are communicated using tools such as pencils and computers.
- observe and model many types of structures, e.g., residences, skyscrapers, bridges, tunnels, airports.
- describe and experience how objects can be made from materials such as wood, plastic, paper, metal, and clay by processes often involving machines.
- describe how people and goods are transported using boats, automobiles, trucks, airplanes, and space vehicles.
- describe differences between natural objects and objects made by people.
- identify daily activities that involve the use of technology, e.g., communication, transportation.
- describe ways in which technological tools and methods allow us to better learn about the laws of nature.
- document how technological inventions and innovations have been developed by women and men from various racial and cultural backgrounds, including individuals from Massachusetts.
- examine evidence that where people live, and how they communicate, and how they travel reflect technological changes.

Science, Technology, and Human Affairs

Science, Technology, and Human Affairs (*Framework*, pp. 90 and 110)

Students engage in problem solving, evaluating evidence, searching for connections, and the process of inquiry, in order to

- describe how technologies may have positive and negative impacts on people and the environment.³⁰
- give examples to show that many of today's technologies were not part of the world of their parents or grandparents.
- describe some ways in which science and technology have changed the way people do their work and live their lives.
- give examples to show that the decisions we make as individuals have effects on other people.
- explore and describe how science and technology have also created problems we need to solve.
- give examples to show that we (as individuals, groups, and communities) can make decisions that change the natural environment.

³⁰ This learning standard derives from the *Technology* strand of the *Framework*.

MCAS Spring 1999 Common Test Items

Science & Technology, Grade 4

Test Administration Sessions

Grade 4 MCAS Student Test Booklets included 2 separate Science & Technology test sessions. Each session included multiple-choice and open-response questions.

Reference Materials and Tools

No reference tools or materials were allowed during any Science & Technology test session.

Session 1, Multiple-choice Questions

1. Benny found the average air temperatures for his town from September to May and put them in this chart.

He noticed he did not have the average temperature for March. Based on the chart, what is the best estimate of the average air temperature for his town in March?

Average Air Temperature	
Sep	70° F
Oct	60° F
Nov	47° F
Dec	34° F
Jan	31° F
Feb	33° F
Mar	
Apr	52° F
May	61° F

- A. 33°F
- ✓ B. 41°F
- C. 56°F
- D. 65°F

Reporting Category/Subcategory for Item 1: Inquiry/Designing an Investigation (p. 200)

2. Why is it better to wear a white T-shirt than a dark blue T-shirt in the summer?
- A. Light-colored clothes let more air in.
 - B. Light-colored clothes prevent sweating.
 - C. Light-colored clothes are not as heavy as dark-colored clothes.
 - ✓ D. Light-colored clothes reflect more sunlight than dark-colored clothes.

Reporting Category/Subcategory for Item 2: Physical Sciences/Energy (p. 201)

3. The life cycle of some plants includes the process of pollination. Pollination is helped by
- ✓ A. wind, water, and insects.
 - B. sun, water, and roots.
 - C. humans, sun, and stems.
 - D. roots, wind, and stems.

Reporting Category/Subcategory for Item 3: Life Sciences/Characteristics of Organisms (p. 202)

4. Mount Arenal, a volcano in Costa Rica, is erupting. Heat is being released during the eruption. What is the source of the heat?
- A. The heat comes from the Sun.
 - B. The heat comes from pools of underground water.
 - ✓ C. The heat comes from deep within Earth.
 - D. The heat comes from decaying plants and animals.

*Reporting Category/Subcategory for Item 4: **Earth and Space Sciences/Properties of Earth's Materials** (pp. 203-204)*

Use the sign to answer question 5.

5. What is the likely reason for such rules?
- ✓ A. Some materials are not as easily recycled as others.
 - B. The recycling center must limit the amount of recycled materials.
 - C. The recycling center workers do not like to handle some materials.
 - D. Plastics are very harmful to the environment.



*Reporting Category/Subcategory for Item 5: **Technology/Understanding and Using Technology** (p. 205)*

6. You wish to closely observe a small insect. Which tool is the best to use?
- A. a balance
 - B. a test tube
 - C. a telescope
 - ✓ D. a magnifying glass

*Reporting Category/Subcategory for Item 6: **Inquiry/Data Collection, Measurement, and Display** (p. 200)*

7. What force pulls things towards the center of Earth?

- A. magnetism
- ✓ B. gravity
- C. friction
- D. energy

*Reporting Category/Subcategory for Item 7: **Physical Sciences/Position and Motion of Objects** (p. 201)*

8. Which item below is NOT made from a material grown in nature?

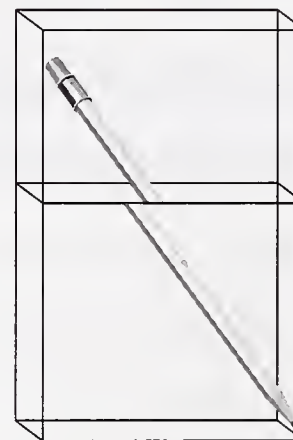
- A. a cotton shirt
- B. a wooden chair
- ✓ C. a plastic spoon
- D. a grass basket

*Reporting Category/Subcategory for Item 8: **Technology/Understanding and Using Technology** (p. 205)*

Use the picture to answer question 9.

9. The picture shows a pencil in a container of water. Why does the pencil look as if it is broken?

- A. because the shiny glass reflects light
- B. because the water separates the light into many colors
- C. because the part of the pencil outside the water casts a shadow reflected by the water
- ✓ D. because light rays are bent when they pass from air into water and from water into air



*Reporting Category/Subcategory for Item 9: **Physical Sciences/Energy** (p. 201)*

10. An animal that has thick fur, webbed feet, and blubber would probably live in the

- ✓ A. Arctic Ocean.
- B. Amazon Rain Forest.
- C. Intracoastal Waterway, Florida.
- D. Mojave Desert, California.

Reporting Category/Subcategory for Item 10: Life Sciences/Adaptations, Diversity, and Heredity (pp. 202-203)

11. Which of the following would be more likely to pollute a river?

- A. allowing beavers to build a dam
- ✓ B. spreading fertilizer near the river
- C. mowing the grass on the river bank
- D. fishing from a bridge over the river

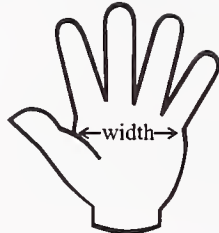
Reporting Category/Subcategory for Item 11: Life Sciences/Organisms and Environments (p. 203)

12. Which of the following is a SOURCE of light?

- A. Earth
- B. planet
- ✓ C. star
- D. moon

Reporting Category/Subcategory for Item 12: Earth and Space Sciences/Objects in the Sky (p. 204)

Use the picture below to answer question 13.



13. Mary wants to find the average width of a fourth grader's hand. Which is the best unit of measurement for her to use?

- A. grams
- B. meters
- ✓ C. centimeters
- D. kilometers

Reporting Category/Subcategory for Item 13: Inquiry/Data Collection, Measurement, and Display (p. 200)

14. Burt used a spoon to stir soup that was cooking on his stove. Which spoon will stay the coolest while he stirs?

- A. an iron spoon
- B. an aluminum spoon
- ✓ C. a wooden spoon
- D. a silver spoon

Reporting Category/Subcategory for Item 14: Physical Sciences/Energy (p. 201)

15. Needles on a cactus plant are actually leaves. This needle shape helps the plant survive by

- A. catching food.
- ✓ B. preventing water loss.
- C. staying in place.
- D. reproducing.

Reporting Category/Subcategory for Item 15: Life Sciences/Adaptations, Diversity, and Heredity (pp. 202-203)

16. What explains how day and night occur in different parts of Earth?

- ✓ A. Earth rotates on its axis.
- B. Earth revolves around the Sun.
- C. The Sun rotates on its axis.
- D. The Sun revolves around the galaxy.

*Reporting Category/Subcategory for Item 16: **Earth and Space Sciences/Objects in the Sky** (p. 204)*

17. You need to move products across the ocean from Boston to Europe. What are your choices?

- ✓ A. ship or airplane
- B. truck or ship
- C. truck or airplane
- D. tunnel or ship

*Reporting Category/Subcategory for Item 17: **Technology/Understanding and Using Technology** (p. 205)*

Session 1, Open-response Questions

18. Rocks and minerals can be identified by their physical properties. You have a mineral sample. Name and describe THREE tests you might use to help identify the mineral.

*Reporting Category/Subcategory for Item 18: **Earth and Space Sciences/Properties of Earth's Materials** (pp. 203-204)*

19. Design a tool that could be used to catch raw eggs dropped from a height of 10 feet without breaking the eggshells.
- Draw a picture of the tool.
 - In the drawing you did in part a, label the parts of your tool.
 - Explain how your tool catches and holds the eggs.
 - Explain how your tool keeps the eggshells from breaking when it catches the eggs.

*Reporting Category/Subcategory for Item 19: **Technology/The Design Process** (p. 204)*

Session 2, Multiple-choice Questions

20. Maya did a survey on eye color of students in her grade. She collected the following data:

Eye Color	Number of Boys	Number of Girls
Blue	14	13
Green	10	20
Hazel	10	17
Brown	22	9

Which eye color is the most common in her grade?

- A. blue
- B. green
- C. hazel
- ✓ D. brown

Reporting Category/Subcategory for Item 20: Inquiry/Analysis and Interpretation of Data (p. 200)

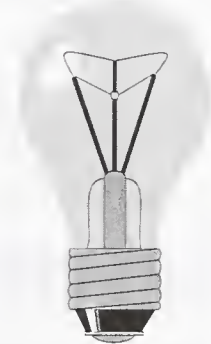
21. A marsh in your neighborhood dried up during a long, hot summer. This is most likely to cause which of the following changes in the neighborhood?

- A. an increase in the number of bats
- ✓ B. a decrease in the number of mosquitoes
- C. an increase in the number of insect-eating birds
- D. a decrease in the number of Japanese beetles

Reporting Category/Subcategory for Item 21: Life Sciences/Organisms and Environments (p. 203)

22. A light bulb changes electrical energy into

- A. light energy only.
- B. heat and mechanical energy.
- ✓ C. light and heat energy.
- D. light and mechanical energy.



Reporting Category/Subcategory for Item 22: Physical Sciences/Energy (p. 201)

23. Why is it that the Moon can sometimes be seen during the day as well as at night?

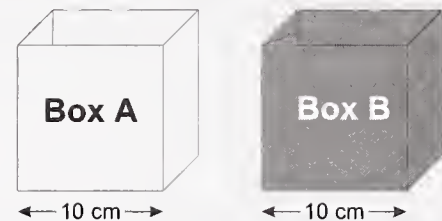
- ✓ A. The Moon reflects light from the Sun all the time.
- B. The Sun goes around Earth and the Moon every day.
- C. Earth reflects light from the Moon all the time.
- D. The Moon goes around Earth every day.

Reporting Category/Subcategory for Item 23: Earth and Space Sciences/Objects in the Sky (p. 204)

Use the information below to answer question 24.

The two boxes are the same size.

- Box A is made of white plastic.
- Box B is made of black plastic.



Five hundred milliliters (500 ml) of cold water was poured into each box. Then the boxes were covered and placed in the sun.

The water temperature was recorded every five minutes. The results are shown in the table below.

Box	TEMPERATURE OF WATER (°C)			
	5 minutes	10 minutes	15 minutes	20 minutes
A	2°C	4°C	6°C	8°C
B	5°C	9°C	13°C	17°C

24. Suppose that Box A was left in the sun for 25 minutes. What do you predict the temperature of the water in Box A would be?

- A. about 0°C
- B. about 7°C
- C. about 8°C
- ✓ D. about 10°C

Reporting Category/Subcategory for Item 24: Inquiry/Analysis and Interpretation of Data (p. 200)

25. Which of the following is a way that everyone can help with conservation efforts?

- A. camp in the woods
- ✓ B. use biodegradable materials
- C. visit a landfill
- D. use disposable plates

*Reporting Category/Subcategory for Item 25: **Technology/Science, Technology, and Human Affairs** (p. 206)*

26. An example of a solid turning into a liquid is

- A. steam turning into water.
- B. water turning into steam.
- ✓ C. ice turning into water.
- D. water turning into ice.

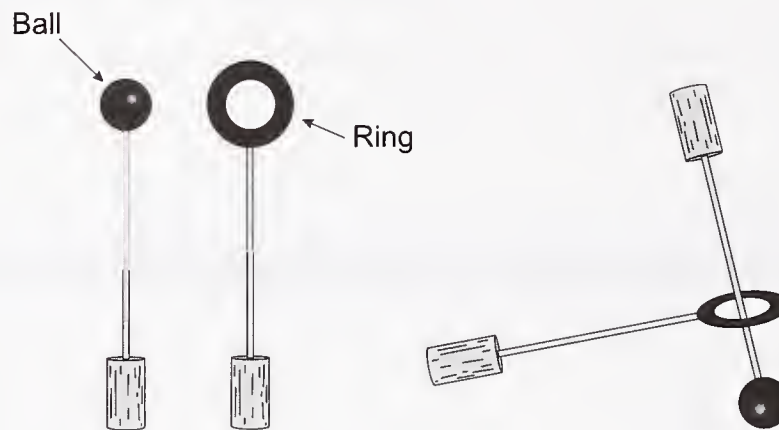
*Reporting Category/Subcategory for Item 26: **Physical Science/Properties of Matter** (pp. 200-201)*

27. Which of the following is a current technological challenge, yet to be solved?

- ✓ A. landing a human on Mars
- B. using solar power to produce electricity
- C. replacing human body parts with artificial parts
- D. using DNA to identify a criminal

*Reporting Category/Subcategory for Item 27: **Technology/The Design Process** (p. 204)*

28. Tasha has the two objects drawn below. One is a metal ring on a stick and one is a metal ball on a stick. The ball can just squeeze through the ring.



If Tasha heats the metal ball, she will probably notice that

- A. the ball will contract and pass through the ring more easily.
- B. the ball will gain mass and become heavier.
- ✓ C. the ball will expand and not fit through the ring.
- D. the ball will be magnetized and be attracted to the ring.

Reporting Category/Subcategory for Item 28: Physical Sciences/Properties of Matter (pp. 200-201)

29. Which of the following properties provides the BEST way to identify a mineral?

- ✓ A. hardness
- B. shape
- C. size
- D. temperature

Reporting Category/Subcategory for Item 29: Earth and Space Sciences/Properties of Earth's Materials (pp. 203-204)

30. Many people like to use microwave ovens rather than traditional ovens. The main reason for this is that microwave ovens

- ✓ A. take less time to cook food than regular ovens do.
- B. get hotter than regular ovens.
- C. do not leave spattered grease or food on the inside.
- D. cannot overcook food.

Reporting Category/Subcategory for Item 30: Technology/Understanding and Using Technology (p. 205)

31. If its food supply in a field decreases, the mouse population in that field will probably

- A. increase.
- ✓ B. decrease.
- C. remain the same.
- D. become extinct.

Reporting Category/Subcategory for Item 31: Life Sciences/Organisms and Environments (p. 203)

32. What can we learn by studying fossils?

- A. how hurricanes formed long ago
- B. how the solar system was formed
- C. the cause of strong earthquakes
- ✓ D. how Earth's environments have changed

Reporting Category/Subcategory for Item 32: Earth and Space Sciences/Properties of Earth's Materials (pp. 203-204)

Use the pictures below to answer question 33.



A



B



C



D

33. Each of the four glasses above contains water. Suppose you tapped the top of each glass with a metal spoon. Which glass would make the sound with the highest pitch?

- ✓ A. glass A
- B. glass B
- C. glass C
- D. glass D

Reporting Category/Subcategory for Item 33: **Physical Sciences/Position and Motion of Objects (p. 201)**

34. In the first half of this century, which technology allowed people, for the first time, to work IN the city but live OUTSIDE the city?

- A. airplanes
- ✓ B. automobiles
- C. telephones
- D. television

Reporting Category/Subcategory for Item 34: **Technology/Understanding and Using Technology (p. 205)**

35. Reptiles become more active as the day gets warmer. This is because

- A. they have scaly skin.
- B. they have slimy skin.
- C. their body temperature stays at a constant level.
- ✓ D. their body temperature changes with the environment.

Reporting Category/Subcategory for Item 35: Life Sciences/Characteristics of Organisms (p. 202)

36. There is a river at the base of Mount Tom. In the spring the water level is usually very high. In the summer it is lower. The higher level of water during the spring comes from

- A. hurricanes.
- ✓ B. melting snow.
- C. tornadoes.
- D. evaporating water.

Reporting Category/Subcategory for Item 36: Earth and Space Sciences/Properties of Earth's Materials (pp. 203-204)

Session 2, Open-response Questions

37. The bald eagle is our national bird. Describe THREE things we can do to help prevent the bald eagle from becoming extinct.

Reporting Category/Subcategory for Item 37: Life Sciences/Adaptations, Diversity, and Heredity (pp. 202-203)

38. Jamal wanted to learn the fastest way to melt ice on a road. His teacher, Ms. Gonzalez, asked the class for some ideas on how ice on a road is melted.
- List at least TWO ways that ice on a road can be melted.
 - Design and describe an experiment you could use to see which of the two ways is fastest.

Reporting Category/Subcategory for Item 38: Inquiry/Designing an Investigation (p. 200)

39. The students in Ms. Burke's class studied a group of six objects labeled U through Z. They recorded their observations below.

OBJECTS STUDIED BY MS. BURKE'S CLASS

OBJECT	COLOR	WEIGHT	SIZE
U	brown	89 grams	large
V	red	14 grams	small
W	black	9 grams	large
X	brown	84 grams	large
Y	yellow	24 grams	small
Z	red	16 grams	small

- a. In your Student Answer Booklet, draw a chart like the one shown below. Use the information above to sort all of objects U through Z into two groups. On your chart, write the letters to show which objects you put into each of your groups.

GROUP 1	GROUP 2

- b. Describe the property you used to sort the objects into Group 1 and Group 2.
- c. In your Student Answer Booklet draw a chart like the one shown below. Select either Group 1 or Group 2. Sort the objects in that group into two smaller groups. In your chart, write the letters to show which items you put into each of your smaller groups.

GROUP A	GROUP B

- d. Describe the property you used to sort the objects into groups A and B.

Reporting Category/Subcategory for Item 39: *Physical Sciences/Properties of Matter* (pp. 200-201)



IX. Science & Technology

Grade 8

Massachusetts Department of Education

Curriculum Framework *Learning Standards/*

MCAS Reporting Categories

Science & Technology, Grade 8

The 1999 MCAS Science & Technology test was based on the learning standards of the Massachusetts *Science & Technology Curriculum Framework*.³¹ The *Framework* defines four content strands, with three major divisions within the *Domains of Science* strand:

- *Inquiry*
- *Domains of Science*
 - *Physical Sciences*
 - *Life Sciences*
 - *Earth and Space Sciences*
- *Technology*
- *Science, Technology, and Human Affairs*

MCAS results are reported using five similar **reporting categories**:³²

- *Inquiry*
- *Physical Sciences*
- *Life Sciences*
- *Earth and Space Sciences*
- *Technology*

The MCAS *Science & Technology Guide* divides the *Framework*'s content strands (except for *Science, Technology, and Human Affairs*) into multiple subcategories for each grade.³³ These MCAS subcategories are specifically referenced as a tool for interpreting school and district results in the MCAS document, *Guide to Interpreting the Spring 1999 MCAS Reports for Schools and Districts*, due for release later in 1999. Each common item in the second section of this chapter is followed by a reference to the MCAS reporting category and subcategory that contain the learning standard(s) to which the item is related.

Learning standards are grouped below by *Framework* content strand and related MCAS subcategory. Applicable *Framework* page numbers are given in brackets following each heading.³⁴

³¹ Massachusetts Department of Education, *Science & Technology Curriculum Framework: Owning the Questions Through Science & Technology* (Malden, 1996).

³² Please note that these MCAS reporting categories differ from those used in the 1998 MCAS reports to school and districts. The 1998 MCAS reporting categories are referenced as **subcategories** in this chapter.

³³ Massachusetts Department of Education, *Guide to the Massachusetts Comprehensive Assessment System: Science & Technology* (Malden, 1998).

³⁴ A very small percentage—less than 1%—of *Science & Technology Curriculum Framework* learning standards that are impractical to test in a large-scale assessment are not tested by MCAS (e.g., at grade 10: “use a range of exploratory techniques, e.g., experiments, information/literature searches, data logging, research and development”). These learning standards are not included in this document.

Inquiry

Designing an Investigation (*Framework*, p. 28)

Students engage in problem solving, evaluating evidence, searching for connections, and the process of inquiry, in order to

- note and describe relevant details, patterns, and relationships.
- differentiate between questions that can be answered through direct investigation and those that cannot.
- apply personal experience and knowledge to make predictions.
- apply multiple lines of inquiry to address and analyze a question, e.g., experimentation, trial and error, survey, interview, and secondary sources.
- design an investigation or problem specifying variables to be changed, controlled, and measured.
- analyze alternative explanations and procedures.
- communicate ideas and questions generated, and suggest improvements or alternatives to the experimental techniques used.

Data Collection, Measurement, and Display (*Framework*, p. 28)

Students engage in problem solving, evaluating evidence, searching for connections, and the process of inquiry, in order to

- use more complex tools to make observations, and gather and represent quantitative data, e.g., microscopes, graduated cylinders, computer probes, stress and impact testers, wind tunnels, and timers.
- represent data and findings using tables, models, demonstrations and graphs.

Analysis and Interpretation of Data (*Framework*, p. 28)

Students engage in problem solving, evaluating evidence, searching for connections, and the process of inquiry, in order to

- describe trends in data even when patterns are not exact.
- reformulate ideas and technological solutions based on evidence.³⁵
- communicate the idea that usually there is more than one solution to a technological problem.³⁶
- design a solution involving a technological problem and describe its advantages and disadvantages.³⁷

³⁵ Related learning standards can be found in the grade 8 subcategory, *The Design Process*.

³⁶ See note 35.

³⁷ See note 35.

Domains of Science: Physical Sciences

Properties of Matter (*Framework, p. 47*)

Students engage in problem solving, evaluating evidence, searching for connections, and the process of inquiry, in order to

- identify properties that allow materials to be distinguished from one another and often make them well suited to specific purposes.
- identify and classify elements and compounds with similar properties, such as metals, metalloids, and non-metals; acids and bases; combustibles and non-combustibles.
- present evidence that a chemical change involves the transformation of one or more substances into new substances with different characteristic properties.
- explore and describe that the mass of a closed system is conserved.
- measure and predict changes in the pressure, temperature, or volume of a gas sample when changes occur in either of the other two properties.
- describe a particulate model for matter that accounts for the observed properties of substances.
- recognize and explain how experimental evidence supports the idea that matter can be viewed as composed of very small particles (such as atoms, molecules and ions) that are in constant motion. Illustrate understanding that particles in solids are close together and not moved about easily; particles in liquids are about as close together and move about more easily; and particles in gases are quite far apart and move about freely.
- provide evidence that shows how the conservation of mass is consistent with the particulate model that describes changes in substances as the result of the rearrangement of the component particles.

Motion (*Framework, p. 48*)

Students engage in problem solving, evaluating evidence, searching for connections, and the process of inquiry, in order to

- show and describe how forces acting on objects as pushes or pulls can either reinforce or oppose each other.
- demonstrate that all forces have magnitude and direction; create situations to model how forces acting in the same direction reinforce each other and forces acting in different directions may detract or cancel or nullify each other.
- describe and represent an object's motion graphically in terms of direction, speed, velocity, and/or position versus time; describe these quantities verbally and mathematically.

Energy (*Framework*, p. 48)

Students engage in problem solving, evaluating evidence, searching for connections, and the process of inquiry, in order to

- represent an understanding that energy cannot be created or destroyed but exists in different interchangeable forms, such as light, heat, chemical, electrical, and mechanical.
- present evidence that heat energy moves in predictable ways, flowing from warmer objects to cooler ones until both objects are at the same temperature.
- illustrate an understanding that energy comes to Earth as electromagnetic radiation in a range of wavelengths, such as light, infrared, ultraviolet, microwaves, and radio waves.
- investigate and describe an understanding of visible electromagnetic radiation, which we generally call light, with reference to qualities such as color and brightness. Illustrate understanding that light has direction associated with it, and can be absorbed, scattered, reflected, or transmitted by intervening matter.
- explain ways that energy can be changed from one form to another.
- demonstrate principles of electrical circuits.

Domains of Science: Life Sciences

Characteristics of Organisms (*Framework*, p. 62)

Students engage in problem solving, evaluating evidence, searching for connections, and the process of inquiry, in order to

- identify the cell as the basic unit of life and the smallest unit that can reproduce itself. Give examples of single and multicellular organisms.
- explore and describe an understanding that plants, animals, fungi, and various types of microorganisms are major categories of living organisms. Each category includes many different species. Note that these categories are subject to change. Life does not always fit into neat categories (e.g., are viruses alive?).
- observe and explain that in single cells there are common features that all cells have as well as differences that determine their function.
- investigate and illustrate evidence that cell replication results not only in the multiplication of individual cells, but also in the growth and repair of multicellular organisms.
- present data to illustrate that all organisms, whether single or multicellular, exhibit the same life processes, including growth, reproduction and the exchange of materials and energy with their environments.

- describe ways that cells can differ in multicellular organisms, assuming different appearances and carrying out specialized functions.
- investigate and explain that complex multicellular organisms are interacting systems of cells, tissues, and organs that fulfill life processes through mechanical, electrical, and chemical means, including procuring or manufacturing food, and breathing and respiration.

Diversity, Adaptation, and Reproduction of Organisms (*Framework*, pp. 62–63)

Students engage in problem solving, evaluating evidence, searching for connections, and the process of inquiry, in order to

- explain situations in which short-term changes in available food, moisture, or temperature of an ecosystem may result in a change in the number of organisms in a population or in the average size of individual organisms or in the behavior of individuals in a population.
- explore and illustrate that, in both the short and long term (millions of years), changes in the environment have resulted in qualitative and quantitative changes in the species of plants and animals that inhabit Earth.
- explain the importance of reproduction to the survival of the species.
- investigate and describe processes by which organisms that have two parents receive a full set of genetic instructions by way of the parents' reproduction cells specifying individual traits from each parent. Offspring exhibit traits from each parent.
- illustrate an understanding that sorting and recombining of the genetic material of parents during reproduction produce the potential for variation among offspring.
- examine evidence and describe that there are minor differences among individuals from the same population or among individuals of the same species.

Ecosystems and Organisms (*Framework*, p. 63)

Students engage in problem solving, evaluating evidence, searching for connections, and the process of inquiry, in order to

- present evidence that species depend on one another.
- explore and illustrate how energy is supplied to an ecosystem primarily in the form of sunlight.
- observe and illustrate the variety of ways in which plants, animals, fungi, and microorganisms interact.
- classify organisms according to the function they serve in a food chain (any single organism can serve each of these functions): production of food, consumption of food, or decomposition of organic matter.

Domains of Science: Earth and Space Sciences

Interactions and Cycles in the Earth System/Earth's History (*Framework, pp.76–77*)

Students engage in problem solving, evaluating evidence, searching for connections, and the process of inquiry, in order to

- demonstrate an understanding of the internal and external structure of planet Earth.
- explore and illustrate an understanding that heat flow and movement of material within Earth moves the continents, causes earthquakes and volcanic eruptions, and creates mountains and ocean bases.
- evaluate conditions under which sedimentary, igneous, and metamorphic rocks form.
- identify ways in which soil is formed by the weathering of rock and the decomposition of dead plants and animal debris.
- give evidence that water in the Earth system exists naturally in all three states and water continuously circulates through the Earth's crust, oceans and air (water cycle).
- demonstrate an understanding that, like all planets and stars, Earth is approximately spherical in shape. (also addressed in reporting category "Earth and Space")
- present evidence that Earth's oceans are a reservoir of nutrients, minerals, dissolved gases, and life forms which are the major source of water vapor for the atmosphere and that the store of heat transported by ocean currents greatly affect Earth's climate.
- observe and describe evidence that local climate changes over periods of years or decades, while global climate changes much more slowly.
- examine and demonstrate evidence that weather can be studied in terms of properties of the atmosphere such as pressure, temperature, humidity, wind speed and direction, precipitation, and amount and type of clouds.
- explain that clouds reflect much of the sunlight intercepted by Earth, while at the same time returning to Earth's surface a large fraction of the far infrared energy emitted from the surface.
- examine and demonstrate evidence that the atmosphere and the oceans have a limited capacity to recycle materials naturally.
- explore and describe that rain or snow falls and moves by gravity from higher to lower areas both on the surface and on the ground and that the natural flow region is called the watershed.

- investigate and illustrate ways in which human activities, such as reducing the amount of forest cover, increasing the amount and variety of chemicals released into the atmosphere, and intensive farming, have changed Earth's land, oceans, and atmosphere.
- examine evidence and illustrate that the movement of the continents has had significant effects on the distribution of living things.
- examine and describe ways in which rocks, fossils, ice cores, and tree rings record events of Earth's history, documenting plate movements, volcanic eruptions, cycles of erosion and deposition, and the evolution of life.

Earth and Space (*Framework*, pp. 77–78)

Students engage in problem solving, evaluating evidence, searching for connections, and the process of inquiry, in order to

- observe and demonstrate that the patterns of stars in the sky stay the same, although they appear to move across the sky nightly, and different stars can be seen in different seasons.
- explore and explain that telescopes magnify the appearance of some distant objects in the sky, including the moon and the planets.
- observe and illustrate that planets change their positions against the background of stars.
- recognize and describe that the Solar System contains the central sun, the known planets, their moons, and many asteroids, meteors, and comets that orbit the sun.
- demonstrate evidence that the sun is a medium-sized star located near the edge of a disk-shaped galaxy of stars, part of which can be seen as a glowing band of light that spans the sky on a very clear night.
- illustrate that the universe contains many billions of galaxies, and each galaxy contains many billions of stars.
- observe and explain that Earth has a natural satellite, the moon, that circles the planet approximately every 29 days.
- give evidence that gravity is a force that produces an attraction between matter. Gravity pulls on or anywhere near Earth toward the Earth's center and acts across space to hold the moon in its orbit around Earth and the planets in their orbits around the sun.
- illustrate that the Sun produces energy and is the major source of heat and light for Earth.

Technology

The Design Process (*Framework*, p. 92)

Students engage in problem solving, evaluating evidence, searching for connections, and the process of inquiry, in order to

- identify and work on their own problem or one developed by a peer.
- explore and illustrate possible solutions and, from these, propose one solution.
- make a plan for building a device considering the limitations of the material and including multiple views.
- evaluate designs, devices, or solutions and develop measures of quality.
- communicate the process of technological design.

Understanding and Using Technology (*Framework*, pp. 94–95)

Students engage in problem solving, evaluating evidence, searching for connections, and the process of inquiry, in order to

- use tools, materials, and machines safely and effectively.
- explain how the choice of materials depends upon their properties and characteristics and how they interact with other materials.
- use the results of material tests (i.e., hardness, tensile strength, conductivity) to suggest appropriate uses for materials.
- model the ways that multiple resources are used to develop new technologies. These include people, information, tools and machines, materials, energy, capital, and time.
- give examples that information can be communicated both graphically and electronically by a range of technological processes.
- explain how a manufacturing enterprise produces a product by converting raw materials into goods.
- identify the processes used in construction: site preparation, building, and finishing a structure.
- compare how transportation systems are devised to transport people and products on land, water, air, and in space.
- describe how power systems are used to convert and transmit mechanical, electrical, fluid, and heat energy. Describe limited (i.e., fossil fuels), unlimited (i.e., solar, gravitational) and renewable (i.e., biomass) energy sources.

- document ways that a range of tools and machines, such as measuring, hand, and optical tools, are used to implement solutions to design problems.
- explain how technological progress has been the result of cumulative work over many centuries by men and women from various cultures and races.
- describe ways that technological advances may be accompanied by negative side effects.
- explain how the evolution of technology led the change from an agricultural to an industrial to an information-based society.
- provide evidence that technology is growing at a faster rate today than ever before in history.
- describe ways in which innovations and inventions address human biological, physical, and psychological needs.

Science, Technology, and Human Affairs

Science, Technology, and Human Affairs (*Framework*, pp. 94 and 110)

Students engage in problem solving, evaluating evidence, searching for connections, and the process of inquiry, in order to

- describe situations in which science, technology, and society have influenced each other in the past.
- identify the influences that science and technology have on today's society.
- give examples that the decisions we make as individuals, groups, and communities can affect society and the natural environment and that these changes are not always easy to reverse.
- recognize and demonstrate that while technology can help us to manage societal and environmental problems, it can also have a negative impact on society and on the natural world.
- describe ways that technological devices have improved the quality of life for individuals.³⁸

³⁸ This learning standard derives from the *Technology* strand of the *Framework*.

MCAS Spring 1999 Common Test Items

Science & Technology, Grade 8

Test Administration Sessions

Grade 8 MCAS Student Test Booklets included 3 separate Science & Technology test sessions. Each session included multiple-choice and open-response questions.

Reference Materials and Tools

No reference tools or materials were allowed during any Science & Technology test session.

Session 1, Multiple-choice Questions

1. The primary cause of continental drift, earthquakes, and volcanic eruptions is

- ✓ A. convection currents beneath Earth's crust.
- B. the rotation of Earth on its axis.
- C. the gradual sinking of Earth's crust.
- D. heat from the Sun warming Earth.

Reporting Category/Subcategory for Item 1: Earth and Space Sciences/Interactions and Cycles in the Earth System/Earth's History (pp. 232-233)

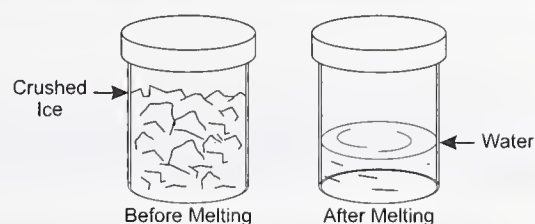
2. Which technological advancement has done the most to improve the accuracy of weather predictions?

- A. barometer
- B. weather balloons
- C. anemometer
- ✓ D. satellites

Reporting Category/Subcategory for Item 2: Technology/Science, Technology, and Human Affairs (p. 235)

Use the information below to answer question 3.

A can was filled with crushed ice, sealed, and massed. The ice was melted by slowly warming the can and its contents. No water vapor escaped and no air entered the can.



3. If the can is then massed again, what is the best prediction of the mass?

- ✓ A. The mass would be the same.
- B. The mass would be more.
- C. The mass would be less.
- D. It is impossible to predict without more information.

Reporting Category/Subcategory for Item 3: Physical Sciences/Properties of Matter (p. 229)

4. Linda travelled the same distance walking, riding a bike, and driving a car. For each mode of travel, the table shows her average speed and the amount of time required to travel the distance.

MODE	SPEED (kilometers per hour)	TIME (minutes)
walking	5	120
riding a bike	10	60
driving a car	60	10

As Linda's speed increased, how did the amount of time change?

- A. Time increased proportionally.
- ✓ B. Time decreased proportionally.
- C. Time increased randomly.
- D. Time decreased randomly.

Reporting Category/Subcategory for Item 4: Inquiry/Analysis and Interpretation of Data (p. 228)

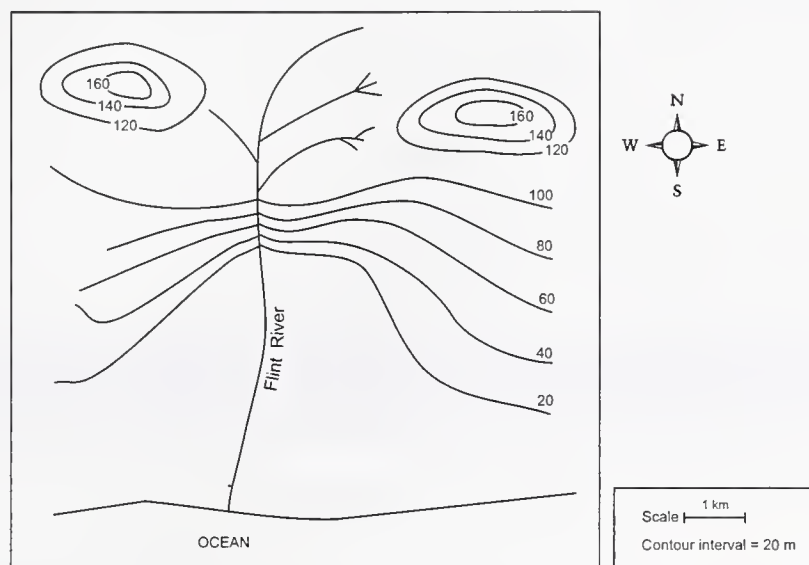
5. The suspension system of a truck includes the
- A. engine and carburetor.
 - ✓ B. wheels and axles.
 - C. brakes and muffler.
 - D. steering wheel and speedometer.

Reporting Category/Subcategory for Item 5: Technology/Understanding and Using Technology (pp. 234-235)

6. Which are produced during photosynthesis?
- A. carbon dioxide and minerals
 - B. carbon dioxide and sugar
 - C. oxygen and minerals
 - ✓ D. oxygen and sugar

Reporting Category/Subcategory for Item 6: Life Sciences/Characteristics of Organisms (pp. 230-231)

Use the topographic map below to answer question 7.



7. The river flows

- A. north.
- ✓ B. south.
- C. east.
- D. west.

Reporting Category/Subcategory for Item 7: **Earth and Space Sciences/Interactions and Cycles in the Earth System/Earth's History (pp. 232-233)**

8. In pea plants, tall is dominant over short. What size pea plants will result when a pure tall plant is crossed with a pure short plant?

- A. middle-sized plants
- B. short plants
- ✓ C. tall plants
- D. some tall and some short plants

Reporting Category/Subcategory for Item 8: **Life Sciences/Diversity, Adaptation, and Reproduction of Organisms (p. 231)**

9. Large amounts of industrial gases are released into the atmosphere every day. What happens to those gases?
- A. They are broken down by ultraviolet light from the Sun.
 - B. They are converted into nitrogen and oxygen.
 - C. They rise through the atmosphere and go into outer space.
 - ✓ D. They remain in the atmosphere for long periods of time.

*Reporting Category/Subcategory for Item 9: **Earth and Space Sciences/Interactions and Cycles in the Earth System/Earth's History** (pp. 232-233)*

10. The energy that allows the water cycle to occur comes from
- A. friction.
 - B. electricity.
 - ✓ C. the Sun.
 - D. radioactive decay.

*Reporting Category/Subcategory for Item 10: **Earth and Space Sciences/Earth and Space** (p. 233)*

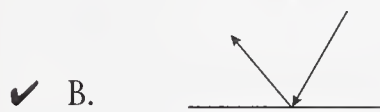
11. The first step in the construction of a building typically involves
- ✓ A. clearing the land.
 - B. setting the foundation.
 - C. servicing the structure.
 - D. installing utilities.

*Reporting Category/Subcategory for Item 11: **Technology/Understanding and Using Technology** (pp. 234-235)*

Use the diagram below to answer question 12.



12. A ray of light shines on a mirror at the angle shown above. Which diagram shows what will happen to the light after it strikes the mirror?



Reporting Category/Subcategory for Item 12: *Physical Sciences/Energy* (p. 230)

Session 1, Open-response Questions

13. James and Susan made several small parachutes by cutting out different-sized squares of plastic and tying four strings to the corners that were then tied to one or more hanging paper clips. They then held each parachute 1.5 meters above the ground, dropped it, and measured the time it took for each parachute to fall to the ground.



- Identify one factor that would affect the time of a parachute's fall.
- Predict the relationship between the factor you have identified and the time of fall.
- Describe an experiment you could conduct to test your prediction.

Reporting Category/Subcategory for Item 13: Inquiry/Designing an Investigation (p. 228)

14. As recently as 20 years ago, New Englanders were able to enjoy seasonal fresh fruit and vegetables **only** in the spring and summer. Presently, New Englanders can purchase seasonal fresh fruit and vegetables at any time of the year.

Identify three technological advances that have made it possible for food retailers to offer consumers seasonal fresh fruits and vegetables throughout the year. Explain how each has made this possible.

Reporting Category/Subcategory for Item 14: Technology/Science, Technology, and Human Affairs (p. 235)

Session 2, Multiple-choice Questions

15. While studying the relationship between number of trees and amount of atmospheric oxygen, which of the following would be **most** important to take into account?

- ✓ A. contributions to atmospheric oxygen from sources other than trees
- B. the ways in which industrialized nations use trees
- C. the root area of trees
- D. the bark mass of trees

Reporting Category/Subcategory for Item 15: Inquiry/Designing an Investigation (p. 228)

16. Betsy wants to find out if the rainfall in her town contains pollutants. The best way for Betsy to gather this information would be to collect

- A. one sample on one rainy day.
- B. one sample a day on several rainy days.
- C. several separate samples on one rainy day.
- ✓ D. several separate samples on several rainy days.

Reporting Category/Subcategory for Item 16: Inquiry/Designing an Investigation (p. 228)

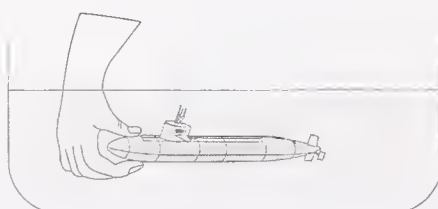
17. Which would be the **most** important to consider when selecting material for the walls and ceiling of a concert hall?

- A. chemical properties
- B. mechanical properties
- C. thermal properties
- ✓ D. acoustical properties

Reporting Category/Subcategory for Item 17: Technology/Understanding and Using Technology (pp. 234-235)

Use the information and diagram below to answer question 18.

The diagram shows a toy submarine being held beneath the water surface. The submarine has a weight of 0.5 newton (N). A buoyant force of 0.8 newton (N) is also exerted on the submarine.

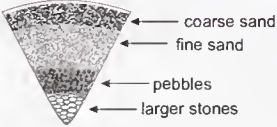
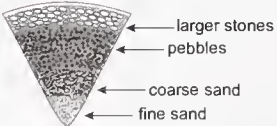
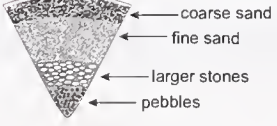



18. What will happen to the submarine when it is released?

- ✓ A. It will rise to the surface.
- B. It will sink directly to the bottom.
- C. It will surface, then sink to the bottom.
- D. It will remain stationary.

Reporting Category/Subcategory for Item 18: **Physical Sciences/Motion** (p. 229)

19. If you wanted to filter a sample of dirty water to remove as much of the dirt as possible, which filter would be **best** to use?

- A. 
- ✓ B. 
- C. 
- D. 

Reporting Category/Subcategory for Item 19: **Earth and Space Sciences/Interactions and Cycles in the Earth System/Earth's History** (pp. 232-233)

20. The ratio of an object's mass to its volume is its

- A. area.
- B. perimeter.
- ✓ C. density.
- D. weight.

Reporting Category/Subcategory for Item 20: Physical Sciences/Properties of Matter (p. 229)

21. It is necessary to add a day to the calendar every four years because

- A. the axis of Earth is tilted.
- B. the gravitational pull of the Sun affects Earth's revolution.
- ✓ C. the revolution of Earth is not exactly 365 days.
- D. the Moon crosses the orbit of the Sun every 28 days.

Reporting Category/Subcategory for Item 21: Earth and Space Sciences/Earth and Space (p. 233)

22. Which kind of bridge uses cables for support?

- A. a truss bridge
- ✓ B. a suspension bridge
- C. a beam bridge
- D. a cantilever bridge

Reporting Category/Subcategory for Item 22: Technology/Understanding and Using Technology (pp. 234-235)

23. Five hundred flies of one species were sprayed with a new insecticide. Twenty-four hours later, nearly all the flies were dead. However, a few survived. Which principle best explains why some flies survived?

- A. Animals adapt to new environments.
- B. New species develop from survivors.
- ✓ C. There is variation among individuals within a species.
- D. Insecticides may cause genetic mutations.

Reporting Category/Subcategory for Item 23: Life Sciences/Diversity, Adaptation, and Reproduction of Organisms (p. 231)

Use the information below to answer question 24.

Each organism on Earth is a part of a complex relationship with other organisms. This relationship is called a food web. The following organisms are part of a food web typically located in and around a reservoir.

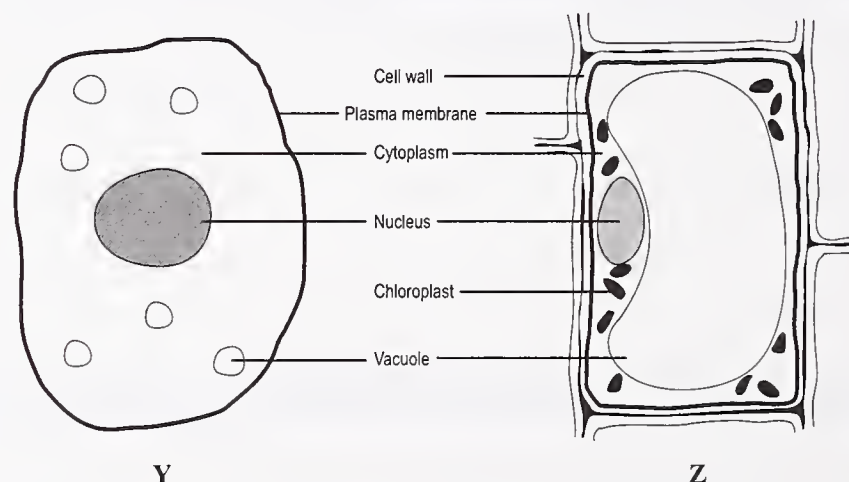
algae	fish	rabbit	eagle	pine tree	grass	field mouse
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24. Which member of the food web is a carnivore?

- A. field mouse
- ✓ B. eagle
- C. rabbit
- D. algae

Reporting Category/Subcategory for Item 24: **Life Sciences/Ecosystems and Organisms** (p. 231)

Use the diagrams below to answer question 25.



25. Which statement about these cells is true?

- A. Cell Y is rigid; cell Z is not.
- B. Cell Y uses oxygen; cell Z does not.
- ✓ C. Cell Z makes its own food; cell Y does not.
- D. Cell Z needs water; cell Y does not.

Reporting Category/Subcategory for Item 25: **Life Sciences/Characteristics of Organisms** (pp. 230-231)

Session 2, Open-response Question

26. A fire badly damaged a tool shed and its contents before the fire was put out. The following observations were made after the fire:

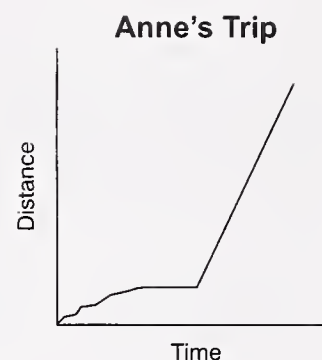
- The wood was charred.
- The paint had bubbled in some places.
- Rusty nails were found among the ashes.
- Plastic tools were unrecognizable.

- a. Classify each of the changes above as either physical or chemical.
- b. Describe the change that caused each of the materials to be found in the condition described above.

Reporting Category/Subcategory for Item 26: Physical Sciences/Properties of Matter (p. 229)

Session 3, Multiple-choice Questions

27. Anne traveled from her home to a friend's house. She constructed this graph to show the relationship between the time and the distance traveled.



Which description is most consistent with the graph?

- ✓ A. Anne started her trip on a country road. She stopped for lunch just before getting onto a superhighway for the rest of her trip.
- B. Anne drove briefly on a superhighway, then on a country road, and finished her trip on a superhighway.
- C. Anne started her trip on a superhighway. She stopped for lunch just before getting onto a country road for the rest of her trip.
- D. Anne drove briefly on a country road, then on a superhighway, and finished her trip on a country road.

Reporting Category/Subcategory for Item 27: Physical Sciences/Motion (p. 229)

28. A scientist is studying the effect of acid rain on oak trees. Of the numbers below, which would be the number of oak trees the scientist should use to obtain the most reliable data?

- A. 1
- B. 2
- C. 20
- ✓ D. 200

Reporting Category/Subcategory for Item 28: Inquiry/Designing an Investigation (p. 228)

Use the picture to answer question 29.

29. The picture represents rock layers in Earth's crust. The event that occurred along line XY is most appropriately described as

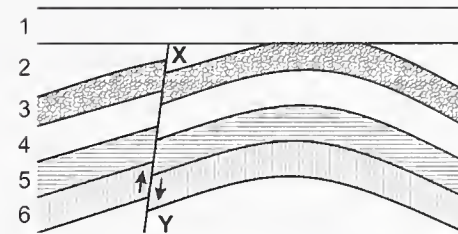


Figure 1

- A. erosion.
- B. volcanic eruption.
- C. sedimentary deposition.
- ✓ D. faulting.

Reporting Category/Subcategory for Item 29: **Earth and Space Sciences/Interactions and Cycles in the Earth System/Earth's History (pp. 232-233)**

30. Because sulfur cannot be decomposed by simple chemical methods into two or more different substances, it is classified as

- ✓ A. an element.
- B. a compound.
- C. a mixture.
- D. a molecule.

Reporting Category/Subcategory for Item 30: **Physical Sciences/Properties of Matter (p. 229)**

31. The process by which information is encoded, transmitted, stored, decoded, and retrieved is called

- A. manufacturing technology.
- B. transportation technology.
- C. construction technology.
- ✓ D. communication technology.

Reporting Category/Subcategory for Item 31: **Technology/Understanding and Using Technology (pp. 234-235)**

32. When coal is burned to produce electricity, the electrical energy produced is less than the potential energy in the coal. Which **best** explains this observation?
- A. As coal is heated, some of the molecules move so fast that they are destroyed.
 - B. Some of the energy in coal is destroyed by the intense heat required to release its potential energy.
 - ✓ C. Some of the potential energy in coal is converted into forms of energy other than electricity.
 - D. The amount of potential energy in fuels is overestimated.

*Reporting Category/Subcategory for Item 32: **Physical Sciences/Energy** (p. 230)*

33. Your community is planning to build a new sanitary landfill. In locating the landfill, which is the **most important** environmental consideration?
- A. the cost of the land
 - ✓ B. the location of the groundwater
 - C. the proximity to an industrial park
 - D. the accessibility to a major highway

*Reporting Category/Subcategory for Item 33: **Technology/Science, Technology, and Human Affairs** (p. 235)*

34. If a new moon occurred on June 2, when will the next new moon occur?
- ✓ A. June 30
 - B. June 28
 - C. June 23
 - D. June 15

*Reporting Category/Subcategory for Item 34: **Earth and Space Sciences/Earth and Space** (p. 233)*

35. To observe materials up close and in greater detail we use

- A. gripping tools.
- ✓ B. optical tools.
- C. cutting tools.
- D. polishing tools.

Reporting Category/Subcategory for Item 35: Technology/Understanding and Using Technology (pp. 234-235)

36. Animals get energy from the food they eat. What is the original source of this energy?

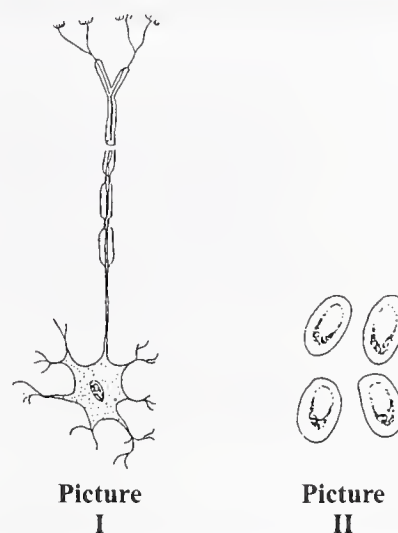
- A. the soil
- B. the water cycle
- ✓ C. the Sun
- D. fertilizers

Reporting Category/Subcategory for Item 36: Life Sciences/Ecosystems and Organisms (p. 231)

Use the pictures to answer question 37.

37. The pictures are cells from the same animal. Which of the following best explains why the cell in Picture I looks so different from the cells in Picture II?

- A. The cells have different DNA.
- ✓ B. The cells have different functions.
- C. The cells in Picture II are very young and still growing.
- D. The cell in Picture I is diseased and damaged.



Reporting Category/Subcategory for Item 37: Life Sciences/Characteristics of Organisms (pp. 230-231)

Session 3, Open-response Questions

38. Explain how plants and animals are interrelated through the production and use of oxygen and carbon dioxide. Include a diagram or flow chart to illustrate your explanation.

Reporting Category/Subcategory for Item 38: Life Sciences/Ecosystems and Organisms (p. 231)

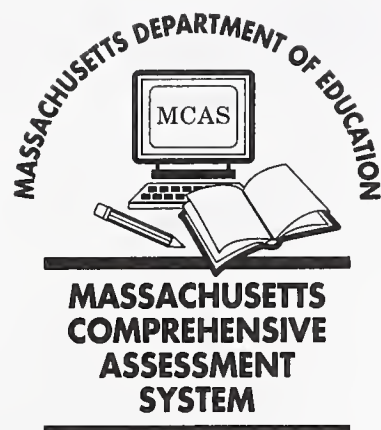
Use the chart below to help you answer open-response question 39.

	Mercury	Venus	Earth	Mars	Jupiter	Saturn	Uranus	Neptune	Pluto
Distance from Sun (million miles)	36	67	93	142	483	886	1,783	2,794	3,666
Diameter of Planet (miles)	3,031	7,521	7,926	4,217	88,730	74,900	31,763	30,775	1,430
Mass of Planet (times Earth's mass)	0.05	0.81	1.00	0.11	317.83	95.18	14.53	17.13	0.002

39. Suppose that two new planets have been discovered.

- Planet Q is located between Venus and Earth and is about the same size as Venus and Earth.
 - Planet Z is located between Saturn and Jupiter and is about the same size as Saturn.
- a. Based on your knowledge of our solar system, describe **three** differences in conditions you would expect to find on Planets Q and Z.
 - b. Explain why you would expect to find these conditions on each of the planets.

Reporting Category/Subcategory for Item 39: Earth and Space Sciences/Earth and Space (p. 233)



X. Science & Technology

Grade 10

Massachusetts Department of Education

Curriculum Framework *Learning Standards/*

MCAS Reporting Categories

Science & Technology, Grade 10

The 1999 MCAS Science & Technology test was based on the learning standards of the Massachusetts *Science & Technology Curriculum Framework*.³⁹ The *Framework* defines four content strands, with three major divisions within the *Domains of Science* strand:

- *Inquiry*
- *Domains of Science*
 - *Physical Sciences*
 - *Life Sciences*
 - *Earth and Space Sciences*
- *Technology*
- *Science, Technology, and Human Affairs*

MCAS results are reported using five similar reporting categories:⁴⁰

- *Inquiry*
- *Physical Sciences*
- *Life Sciences*
- *Earth and Space Sciences*
- *Technology*

The MCAS *Science & Technology Guide* divides the *Framework*'s content strands (except for *Science, Technology, and Human Affairs*) into multiple subcategories for each grade.⁴¹ These MCAS subcategories are specifically referenced as a tool for interpreting school and district results in the MCAS document, *Guide to Interpreting the Spring 1999 MCAS Reports for Schools and Districts*, due for release later in 1999. Each common item in the second section of this chapter is followed by a reference to the MCAS reporting category and subcategory that contain the learning standard(s) to which the item is related.

Learning standards are grouped below by *Framework* content strand and related MCAS subcategory. Applicable *Framework* page numbers are given in brackets following each heading.⁴²

³⁹ Massachusetts Department of Education, *Science & Technology Curriculum Framework: Owning the Questions Through Science & Technology* (Malden, 1996).

⁴⁰ Please note that these MCAS reporting categories differ from those used in the 1998 MCAS reports to school and districts. The 1998 MCAS reporting categories are referenced as subcategories in this chapter.

⁴¹ Massachusetts Department of Education, *Guide to the Massachusetts Comprehensive Assessment System: Science & Technology* (Malden, 1998).

⁴² A very small percentage—less than 1%—of *Science & Technology Curriculum Framework* learning standards that are impractical to test in a large-scale assessment are not tested by MCAS (e.g., at grade 10: “use a range of exploratory techniques, e.g., experiments, information/literature searches, data logging, research and development”). These learning standards are not included in this document.

Inquiry

Designing an Investigation (*Framework*, pp. 28–29)

Students engage in problem solving, evaluating evidence, searching for connections, and the process of inquiry, in order to

- distinguish those observations that are relevant to the question or problem at hand.
- formulate testable questions and generate explanations using the results of predictions.
- use a range of exploratory techniques, e.g., experiments, information/literature searches, data logging, research, and development, etc.
- make decisions about the range and number of independent variables and how to control other variables in designing experiments.
- select and use common and specialized tools to measure the dependent variable.
- select appropriate methods of recording and interpreting data.

Analysis and Interpretation of Data (*Framework*, p. 29)

Students engage in problem solving, evaluating evidence, searching for connections, and the process of inquiry, in order to

- accurately use scientific and technological nomenclature, symbols and conventions when representing and communicating ideas, procedures, and findings.
- select appropriate means for representing, communicating, and defending a scientific and technological argument.
- question interpretations or conclusions for which there is insufficient supporting evidence, and recognize that any conclusion can be challenged by further evidence.
- formulate further testable hypotheses based on the knowledge and understanding generated.
- interpret data in the light of experimental findings, and appropriate scientific and technological knowledge and understanding.

Domains of Science: Physical Sciences

Structure of Matter (*Framework*, p. 50)

Students engage in problem solving, evaluating evidence, searching for connections, and the process of inquiry, in order to

- explore and describe how matter is made up of elements, compounds, and numerous mixtures of these two kinds of substances.
- demonstrate through the use of manipulatives that atoms interact with one another by transferring or sharing electrons that are furthest from the nucleus.
- represent an understanding that compounds form when atoms of two or more elements bond.

- group elements and compounds into classes, based on similarities in their structures and resulting properties.
- describe an understanding that nuclear changes often result in the emission of high-energy electromagnetic radiation and particles, and present evidence on ways that this has physical repercussions on other materials.
- illustrate an understanding that energy [that] is released in certain nuclear reactions and chemical reactions can be controlled and put to use, or released suddenly and destructively in explosions, fire, or high-energy chemical events.

Interactions of Substances (*Framework*, p. 50)

Students engage in problem solving, evaluating evidence, searching for connections, and the process of inquiry, in order to

- present evidence that solubility of substances may vary with temperature and with the natures of the solute and the solvent.
- suggest how balanced electrical forces between the charges of the protons and electrons are responsible for the stability of substances.
- explain chemical changes in terms of rearrangements of atoms or molecules, which are made possible by the breaking and forming of chemical bonds.
- summarize chemical reactions by symbolic or word equations that specify the reactants and products involved.
- illustrate ways in which the periodic table is useful in predicting the chemical and physical properties of known elements and those yet to be discovered.

Position and Motion of Objects (*Framework*, p. 51)

Students engage in problem solving, evaluating evidence, searching for connections, and the process of inquiry, in order to

- demonstrate that all forces are vector quantities, having both magnitude and direction.
- represent an understanding that if an object exerts a force on a second object, then the second object exerts an equal and opposite force on the first object.
- describe and represent changes in motion or momentum in terms of being caused by forces.

Energy (*Framework*, p. 51)

Students engage in problem solving, evaluating evidence, searching for connections, and the process of inquiry, in order to

- explore and explain how the total amount of mass and energy remains constant in any closed system.
- describe the nature of waves, such as electromagnetic waves or sound waves, in terms of wave length, amplitude, frequency, and characteristic speed.
- design and conduct an investigation that explores how electromagnetic waves, unlike sound waves, can be transmitted through a vacuum.

(continued on next page)

- demonstrate that the same concepts of energy, matter and their interaction apply both to biological and physical systems on Earth and in the observable universe.

Domains of Science: Life Sciences

Characteristics of Organisms (*Framework*, p. 65)

Students engage in problem solving, evaluating evidence, searching for connections, and the process of inquiry, in order to

- examine evidence and demonstrate that many molecular aspects of life processes of multicellular organisms occur in cells.
- investigate and describe understanding that cells have particular structures that underlie their functions.
- compare and contrast the cell boundaries that control what can enter and leave the cell. Realize that in all but quite primitive cells, a complex network of proteins provides organization and shape.
- give evidence that all organic molecules are constructed of four fundamental elements, i.e., carbon, hydrogen, oxygen and nitrogen.

Heredity and Evolution (*Framework*, pp. 65–66)

Students engage in problem solving, evaluating evidence, searching for connections, and the process of inquiry, in order to

- describe the theory of biological evolution which states that the earth's present-day species are descended from earlier species.
- describe ways in which genetic variation is preserved or eliminated from a population through natural selection.
- examine and summarize evidence that evolution builds on what already exists, so the more variety there is, the more there can be in the future. But know that evolution does not necessitate long-term progress in some set direction.
- give evidence that cells are the repositories of biological information.
- explore and illustrate that chromosomes are the components of cells which convey hereditary information from one cell to its daughter cells and from a parent to its offspring.
- illustrate an understanding that chromosomes are composed of subunits called genes; each gene encodes the information directing the synthesis of a cell product, usually a protein, and can often be identified with a trait observed in the organism.
- describe the structure and function of DNA.

- give evidence that in reproductive processes involving two parents (sexual reproduction), two specialized reproductive cells (gametes), one from each parent (zygote), direct the formation of a new organism that has attributes of both parents.
- discriminate between characteristics that result from the operation of a single gene and some that result from the action of several genes.

Ecosystems (*Framework*, p. 66)

Students engage in problem solving, evaluating evidence, searching for connections, and the process of inquiry, in order to

- examine and describe ways in which the conservation of energy law is a powerful tool for the analysis of energy flow in ecosystems.
- demonstrate an understanding that energy is supplied to ecosystems by sunlight and dissipates as heat. Know that the principal pathway of this dissipation is cellular respiration.
- illustrate an understanding that plants convert light energy into chemical energy.
- explore and illustrate why carbon compounds produced by plants (carbohydrates and oils) are the primary source of energy for all animal life.

Domains of Science: Earth and Space Sciences

Earth Processes (*Framework*, pp. 80–81)

Students engage in problem solving, evaluating evidence, searching for connections, and the process of inquiry, in order to

- demonstrate an understanding that two fundamental forces acting in the Earth System are gravity and electromagnetism. Examine evidence that gravitational force acts between masses and is responsible for changes in the motion of objects on Earth and throughout the universe. Know that electromagnetic force holds matter together; recognize that the Earth itself acts like a magnet.
- observe and illustrate that life is adapted to conditions on the Earth, including the force of gravity that enables the planet to retain an adequate atmosphere, and an intensity of radiation from the sun that allows water to cycle between liquid and vapor.
- examine and give evidence that life has changed the planet in dramatic ways; vegetation and other life forms make important contributions to changes in the face of Earth.
- examine and describe evidence that rocks are continuously being modified by processes such as weathering, erosion, deposition, compaction, cementation, melting, heating (without melting), pressure, and crystallization.

(continued on next page)

- examine models and illustrate that global wind patterns within the atmosphere are determined by the unequal heating between the equator and poles, Earth's rotation, and the distribution of land and ocean. Consequently, weather in northern and southern mid-latitudes tends to move eastward while in the tropics it moves westward. Illustrate understanding that atmospheric winds transport heat poleward from the warm tropics, helping to maintain Earth's climate.
- relate and demonstrate an understanding that the solid crust of the Earth—including both the continents and the ocean basins—consists of separate plates that ride on a denser, hot, gradually deformable layer of the Earth.
- investigate and illustrate the theory that land forms of various shapes and sizes result from both constructive and destructive processes.
- examine and describe evidence that the "solid" Earth has a layered structure, with each layer having characteristic composition and physical properties. A solid inner core is surrounded by a liquid outer core, which in turn is surrounded by a large zone of dense mantle material. The crust is relatively thin compared to the other layers of Earth's interior.

Solar System and Universe (*Framework*, p. 80)

Students engage in problem solving, evaluating evidence, searching for connections, and the process of inquiry, in order to

- give evidence that the universe is estimated to be over ten billion years old, and know some of the evidence for this estimate.
- examine and describe evidence that led to the theory that the Solar System was formed from a cloud of gas and dust that condensed under the influences of gravity and rotation.
- examine and describe evidence that the Milky Way is but one galaxy in a vast, ancient, and expanding universe, which contains a tremendous number of galactic clusters. Convey understanding that most of the universe appears to be empty space, but that more and more kinds of materials are being discovered in interstellar space.

Technology

The Design Process (*Framework*, p. 96)

Students engage in problem solving, evaluating evidence, searching for connections, and the process of inquiry, in order to

- identify a problem or design opportunity that has not necessarily been solved before.
- propose designs and choose among suggested solutions.

- implement a proposed solution that conforms to the design constraints.
- evaluate the solution and its consequences against planned criteria.
- communicate the problem, process and solution.
- redesign the solution.

Understanding and Using Technology (*Framework*, pp. 99–100)

Students engage in problem solving, evaluating evidence, searching for connections, and the process of inquiry, in order to

- describe examples of the wide range of contemporary tools that are used to process and measure materials, energy, physical phenomena, and electronic signals. Some of these include measuring instruments, computer-based tools, and data-capturing sensors.
- use complex tools, machines, and equipment to solve problems.
- identify appropriate ways to select, operate, maintain, and dispose of technological devices.
- identify particular characteristics of material resources, i.e., synthetic, composite, and biological. Explain how various energy sources and forms of information are also resources with specific characteristics.
- discuss issues of resource management including safety, costs, environmental and political concerns.
- give examples of how combinations of graphic and electronic communication processes are used in developing high technology communication systems.
- describe uses of material conversion processes, i.e., separating, forming, conditioning and combining, in production processes.
- identify ways that manufacturing processes have changed with improved tools and techniques.
- compare how existing transportation technologies convey people and products globally.
- give examples of ways in which technological processes could adversely affect the environment.
- give examples of how a technology device, service, or system is used for a particular purpose.
- give examples of how technology has played a key role in the operation of successful Massachusetts and United States businesses.

(continued on next page)

- describe examples of new and emerging technologies in areas of communication, construction, manufacturing, transportation, power, and bio-related technology.
- provide examples of how technology creates new jobs and makes other jobs obsolete.

Science, Technology, and Human Affairs

Science, Technology, and Human Affairs (*Framework*, pp. 99 and 111)

Students engage in problem solving, evaluating evidence, searching for connections, and the process of inquiry, in order to

- describe ways in which technological impacts can be multidimensional (i.e., economic, social, environmental, political).⁴³
- describe ways in which technological inventions and innovations stimulate economic competitiveness and are translated into products and services with marketplace demands.⁴⁴
- participate in technological society as active citizens, consumers, workers, employers, and family members.⁴⁵
- identify situations in which science, technology, and society have influenced each other in the past and describe how science and technology have been an integral part of the history of human society.
- describe situations that illustrate how scientific and technological revolutions have changed society.
- develop skills in applying scientific knowledge to make decisions about problems at the community, state, national and international levels, and recognize that using these skills responsibly is an essential part of being a citizen in today's world.
- describe ways in which technological development has been influenced by the culture of the society and by the resources available to that society.
- give evidence that rapidly changing technology affects global competition and jobs.

⁴³ This learning standard derives from the *Technology* strand of the *Framework*.

⁴⁴ See note 43.

⁴⁵ See note 43.

MCAS Spring 1999 Common Test Items

Science & Technology, Grade 10

Test Administration Sessions

Grade 10 MCAS Student Test Booklets included 3 separate Science & Technology test sessions. Each session included multiple-choice and open-response questions.

Reference Materials and Tools

No reference tools or materials were allowed during any Science & Technology test session.

Session 1, Multiple-choice Questions

1. The ultraviolet portion of the electromagnetic spectrum is responsible for both suntans and sunburns. Many scientists believe that levels of ultraviolet radiation reaching Earth's surface will increase because
 - A. of increased atmospheric levels of CO₂.
 - ✓ B. of the breakdown of the ozone layer.
 - C. the Sun is emitting more ultraviolet radiation.
 - D. of the increased use of radios and televisions.

Reporting Category/Subcategory for Item 1: Physical Sciences/Energy (pp. 257-258)

2. Which statement about plant and animal cells is true?
 - A. Plant cells have a nucleus and a cell wall; animal cells do not have either of these structures.
 - ✓ B. Plant cells have a cell wall and chloroplasts; animal cells do not have either of these structures.
 - C. Plant cells have a cell wall and a cell membrane; animal cells have a cell wall, but not a cell membrane.
 - D. Plant cells have chloroplasts and mitochondria; animal cells have chloroplasts, but do not have mitochondria.

Reporting Category/Subcategory for Item 2: Life Sciences/Characteristics of Organisms (p. 258)

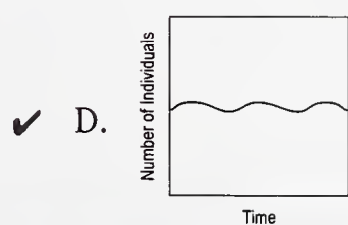
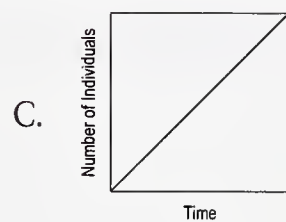
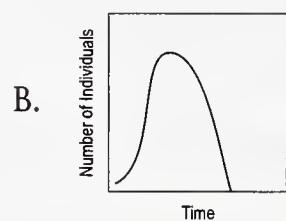
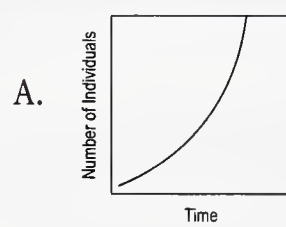
3. On a particular day, high tide occurred in Boston Harbor at 12:21 A.M. and 12:46 P.M. At what times did low tide most likely occur?
 - ✓ A. 6:34 A.M. and 6:46 P.M.
 - B. 12:14 A.M. and 12:56 P.M.
 - C. 11:37 A.M. and 11:15 P.M.
 - D. 6:18 A.M. and 11:58 P.M.

Reporting Category/Subcategory for Item 3: Earth and Space Sciences/Earth Processes (p. 259)

4. The amplitude, frequency, and shape of an electrical signal can be displayed and measured using
- A. a signal generator.
 - B. a multimeter scope.
 - ✓ C. an oscilloscope.
 - D. an odometer.

Reporting Category/Subcategory for Item 4: **Technology/Understanding and Using Technology** (pp. 261-262)

5. Which graph shows a population in ecological balance with the carrying capacity of its environment?



Reporting Category/Subcategory for Item 5: **Inquiry/Analysis and Interpretation of Data** (p. 256)

6. The large number of volcanoes and earthquakes located near the shores of the Pacific Ocean are most accurately explained by
- ✓ A. the movement of crustal plates.
 - B. the unequal heating of Earth by the Sun.
 - C. the increasing diameter of Earth.
 - D. Earth's radiation of heat into space.

Reporting Category/Subcategory for Item 6: Earth and Space Sciences/Earth Processes (pp. 259-260)

Session 1, Open-response Questions

7. Engineers from a coal-powered electrical generating plant (a coal-fired power plant) are planning to convert its boilers to run on natural gas. The engineers from the plant, which is located on a bay, are planning to run a connecting gas pipeline from the main line to the plant. This pipeline will run through several suburban areas, through a heavily wooded area, near some wetlands, and under the bay before connecting to the power plant. Explain one sociological, one political, and one environmental concern that will need to be addressed before the plant is built.

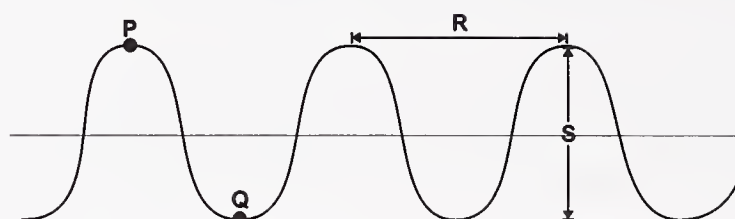
*Reporting Category/Subcategory for Item 7: **Technology/Science, Technology, and Human Affairs** (p. 262)*

8. Potato plants can be grown from potato seeds that form from the flowers that bloom on potato stems. Potato plants can also be grown from pieces of potato that grow sprouts.
- Explain what the difference is in the genotype and phenotype of the plants grown from these two different reproductive processes.
 - Give one advantage of each process.

*Reporting Category/Subcategory for Item 8: **Life Sciences/Heredity and Evolution** (pp. 258-259)*

Session 2, Multiple-choice Questions

Use the diagram to answer question 9.



9. Which letter in the diagram identifies a wavelength?

- A. P
- B. Q
- ✓ C. R
- D. S

Reporting Category/Subcategory for Item 9: Physical Sciences/Energy (pp. 257-258)

10. Cells that use a great amount of energy usually contain numerous

- A. lysosomes.
- B. ribosomes.
- C. vacuoles.
- ✓ D. mitochondria.

Reporting Category/Subcategory for Item 10: Life Sciences/Characteristics of Organisms (p. 258)

11. Marine fossils have been found in exposed rock layers in Massachusetts. Which of the following is the best interpretation of this discovery?

- A. Marine organisms evolved from land-dwelling organisms.
- ✓ B. Parts of Massachusetts were once covered by water.
- C. These organisms could live both in water and on land.
- D. They were carried by humans to Massachusetts.

Reporting Category/Subcategory for Item 11: Earth and Space Sciences/Earth Processes (pp. 259-260)

12. The productivity of the design process has been greatly enhanced by the use of integrated design stations that include computer hardware and software called

- A. CIM.
- ✓ B. CAD.
- C. CAM.
- D. CDS.

Reporting Category/Subcategory for Item 12: *Technology/Understanding and Using Technology* (pp. 261-262)

Use the information below to answer question 13.

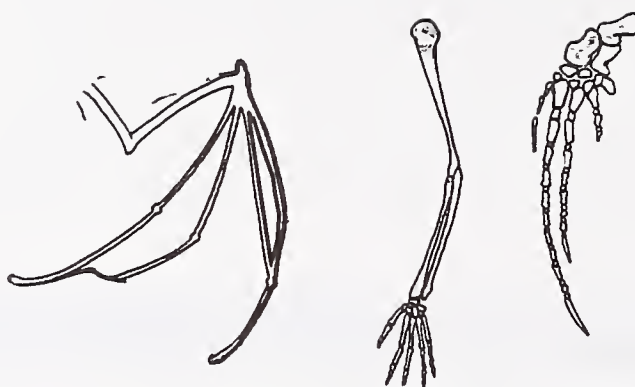
Number	Liquid	Molecular formula	Dielectric constant	Viscosity (cp)	Surface tension (mN/m)
1	cyclohexane	C_6H_{12}	2.0	0.89	24.65
2	carbon tetrachloride	CCl_4	2.2	0.91	26.43
3	toluene	$C_6H_5CH_3$	2.4	0.56	27.93
4	acetone	CH_3COCH_3	20.7	0.31	23.46
5	grease	$C_{16-20}H_{34-42}$	NA	20-200	NA
6	1-butanol	$CH_3CH_2CH_2CH_2OH$	17.8	2.54	24.93
7	1-propanol	$CH_3CH_2CH_2OH$	20.1	1.94	23.32
8	ethanol	CH_3CH_2OH	24.3	1.07	21.97
9	methanol	CH_3OH	32.6	0.54	22.07
10	water	H_2O	78.5	0.89	71.99

13. Examine the information for the alcohols (numbers 6-9). What is the general relationship between the size of the alcohol molecule and the dielectric constant?

- A. As the size of the alcohol molecule increases, the dielectric constant increases.
- ✓ B. As the size of the alcohol molecule increases, the dielectric constant decreases.
- C. As the size of the alcohol molecule decreases, the dielectric constant decreases.
- D. As the size of the alcohol molecule decreases, the dielectric constant remains unchanged.

Reporting Category/Subcategory for Item 13: *Inquiry/Analysis and Interpretation of Data* (p. 256)

Use the illustrations below to answer question 14.



14. The forelimb bones pictured above are cited as evidence to support the common ancestry of organisms because they are similar in

- ✓ A. structure.
- B. mass.
- C. age.
- D. calcium deposits.

Reporting Category/Subcategory for Item 14: Life Sciences/Heredity and Evolution (pp. 258-259)

15. You walk from the back to the front of a train at a speed of 1 km/h. The train is travelling at a speed of 100 km/h. Your speed relative to the train track is

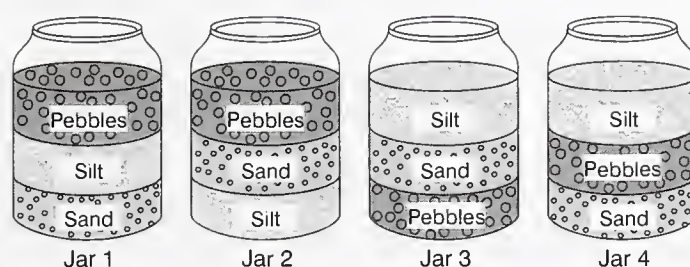
- A. 1 km/h.
- B. 99 km/h.
- C. 100 km/h.
- ✓ D. 101 km/h.

Reporting Category/Subcategory for Item 15: Physical Sciences/Position and Motion of Objects (p. 257)

16. The hereditary information that is contained in the nuclei of human cells controls all of the following **except**
- A. eye color.
 - B. skin color.
 - ✓ C. pierced ears.
 - D. hair type.

Reporting Category/Subcategory for Item 16: **Life Sciences/Heredity and Evolution** (pp. 258-259)

Use the illustration below to answer question 17.



17. You have been given a sample of water and soil that is composed of particles of sand, pebbles, and silt. Which of the jars above shows the probable settling pattern of the soil particles?
- A. Jar 1
 - B. Jar 2
 - ✓ C. Jar 3
 - D. Jar 4

Reporting Category/Subcategory for Item 17: **Earth and Space Sciences/Earth Processes** (pp. 259-260)

18. A common electrical circuit that is used to make audio signals louder is called an amplifier. On which of the following basic components do most typical amplifier circuits rely for this function?
- A. resistor
 - B. capacitor
 - ✓ C. transistor
 - D. diode

Reporting Category/Subcategory for Item 18: **Technology/Understanding and Using Technology** (pp. 261-262)

19. Which of the following represents a double displacement reaction?

- A. $\text{Cl}_2 + 2\text{KBr} \rightarrow 2\text{KCl} + \text{Br}_2$
- ✓ B. $\text{PbCl}_2 + \text{Li}_2\text{SO}_4 \rightarrow 2\text{LiCl} + \text{PbSO}_4$
- C. $\text{Pb}(\text{OH})_2 \rightarrow \text{PbO} + \text{H}_2\text{O}$
- D. $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$

Reporting Category/Subcategory for Item 19: Physical Sciences/Interactions of Substances (p. 257)

20. A number of insecticides do not kill insects as effectively as they once did. This is probably because

- A. the environment has changed.
- ✓ B. some insects develop tolerance to insecticides and survive to produce offspring.
- C. the insecticides are from different manufacturers.
- D. the climate is becoming warmer.

Reporting Category/Subcategory for Item 20: Life Sciences/Heredity and Evolution (pp. 258-259)

21. Radiational cooling occurs when heat absorbed by Earth during the day is radiated into space during the evening. Radiational cooling is most likely to occur when the night conditions are

- A. cloudy and windy.
- B. rainy and calm.
- ✓ C. clear and dry.
- D. cloudy and calm.

Reporting Category/Subcategory for Item 21: Earth and Space Sciences/Earth Processes (pp. 259-260)

22. In which area does the technology of fiber optics have the greatest use?

- ✓ A. communications
- B. ophthalmology
- C. thermal engineering
- D. textile manufacturing

Reporting Category/Subcategory for Item 22: Technology/Understanding and Using Technology (pp. 261-262)

23. The Quabbin Reservoir, located west of Boston, is a major source of drinking water for the metropolitan Boston area. If the state biologist tested the water for bacterial content and found an elevated *E. coli* count, this might indicate that

- A. the water is safe to drink.
- B. the food chain has been extended to the microscopic level.
- ✓ C. sewage may be entering the water.
- D. the oxygen level is below normal.

Reporting Category/Subcategory for Item 23: Technology/Science, Technology, and Human Affairs (p. 262)

Session 2, Open-response Questions

24. A system in technology consists of the following parts: input, process, output, and feedback. A computer is an example of a system in technology.
- Select an area of technology such as construction, transportation, communication, power, or a bio-related field. Identify a system other than a computer in that area of technology.
 - Explain how the system works in terms of input, process, output, and feedback.

Reporting Category/Subcategory for Item 24: Technology/Understanding and Using Technology (pp. 261-262)

25. You work for a fertilizer company. Potassium nitrate (KNO_3) is used in fertilizers. Your boss has decided to develop a new technique that will involve water-based solutions of potassium nitrate, instead of dry powders. You have been assigned to design an experiment. Describe the experiment(s) you would perform to determine the solubility curve for potassium nitrate at various temperatures. Be sure to include the variables to be controlled, varied, and measured.

Reporting Category/Subcategory for Item 25: Physical Sciences/Interactions of Substances (p. 257)

Session 3, Multiple-choice Questions

26. A softball player hitting a ball swings a 1 kg bat. In the process of exerting 2 N of force on the softball, the bat breaks. Which of the following explains why the bat breaks?

- A. The ball is moving at the same rate as Earth's rotation.
- B. The ball is being accelerated by gravity.
- C. Air resistance provides the force to break the bat.
- ✓ D. The ball exerts an equal but opposite force of 2 N on the bat.

Reporting Category/Subcategory for Item 26: Physical Sciences/Position and Motion of Objects (p. 257)

27. Color blindness is a sex-linked gene. Males are more likely to be color blind than females because color blindness is

- A. dominant in one sex and recessive in the other.
- B. influenced by the hormones present in the individual.
- ✓ C. carried only on the X-chromosome and the male has only one X-chromosome.
- D. carried only on the Y-chromosome and the female does not have a Y-chromosome.

Reporting Category/Subcategory for Item 27: Life Sciences/Heredity and Evolution (pp. 258-259)

28. Which of the following would likely be increased by clear-cutting (cutting all the trees in a large forested area) a forest?

- A. erosion only
- B. runoff only
- C. silt in a stream only
- ✓ D. erosion, runoff, and silt in a stream

Reporting Category/Subcategory for Item 28: Earth and Space Sciences/Earth Processes (pp. 259-260)

29. Which of the “greenhouse” gas(es) is a result of technology only and **not** the result of natural processes?

- A. carbon dioxide
- B. nitrogen oxides
- ✓ C. chlorofluorocarbons
- D. sulfur oxides

*Reporting Category/Subcategory for Item 29: **Technology/Science, Technology, and Human Affairs** (p. 262)*

30. In preparing an aqueous solution of a soluble solid compound, it is usually helpful to

- ✓ A. heat the solvent and stir the solution.
- B. cool the solvent and stir the solution.
- C. let the solution stand for a few minutes.
- D. cool the solution and filter it into a beaker.

*Reporting Category/Subcategory for Item 30: **Physical Sciences/Interactions of Substances** (p. 257)*

31. Energy from food is made available to cells by the process of cellular respiration. In this process, carbon dioxide and water are produced from the breakdown of

- A. minerals and vitamins.
- B. ribonuclease.
- ✓ C. glucose.
- D. adenosine monophosphate.

*Reporting Category/Subcategory for Item 31: **Life Sciences/Ecosystems** (p. 259)*

Use the information to answer question 32.

Water Quality

Table 1 lists the concentration of various compounds at the four different sampling sites on the large lake shown on the map. Water sampling at all sites was done simultaneously and under the same conditions using the same equipment. The water samples were taken to the lab for analysis.

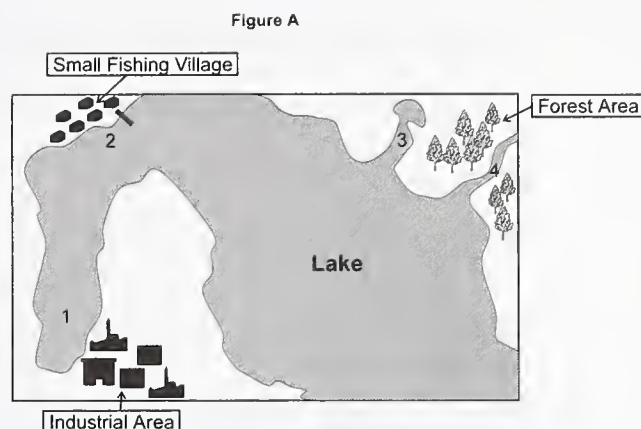


Table 1

Sampling Site	Site Characteristics	Concentration of dissolved substances in parts per million (ppm)		
		oxygen	nitrate	phosphate
1	Heavily-populated industrial area; water is heavily polluted	0.01	22.3	18.8
2	A small fishing village; small population	4.0	3.2	2.8
3	A small bay surrounded by cleared land used for agriculture	2.0	14.5	17.9
4	A river that runs through the most forested, protected area shown on the map	8.0	2.1	1.9

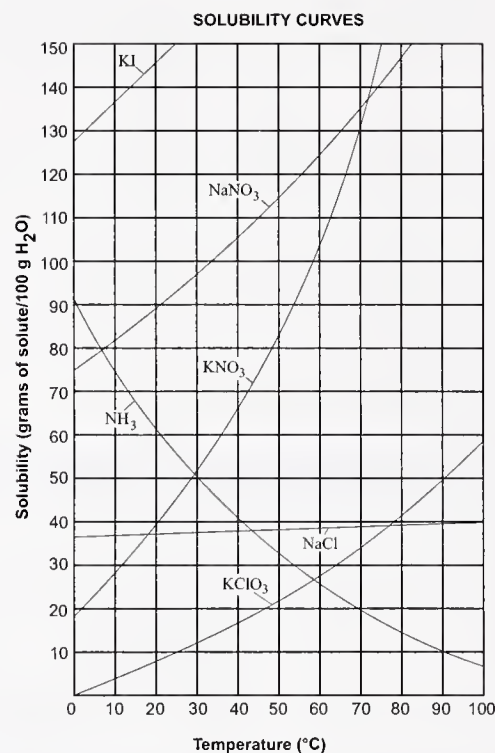
32. Which statement **best** describes the apparent relationship between dissolved phosphates, nitrates, and oxygen levels shown in the table?
- A. The level of dissolved oxygen tends to be lower when nitrate levels are low and phosphate levels are high.
 - ✓ B. The level of dissolved oxygen tends to be lower when both nitrate levels and phosphate levels are high.
 - C. The level of dissolved oxygen tends to be higher when both nitrate levels and phosphate levels are high.
 - D. The level of dissolved oxygen tends to be higher when nitrate levels are low and phosphate levels are high.

Reporting Category/Subcategory for Item 32: *Inquiry/Analysis and Interpretation of Data (p. 256)*

Use the graph to answer question 33.

33. Which substance is the most soluble at 20°C?

- A. NaNO_3
- B. KClO_3
- C. KNO_3
- ✓ D. KI



Reporting Category/Subcategory for Item 33: **Physical Sciences/Interactions of Substances (p. 257)**

34. On a clear night with a full moon, the Moon appears to light up the darkness.
The source of this light is

- A. the luminescence of the moon rocks.
- B. the refraction of light from the other side of Earth.
- ✓ C. the reflection of the light emitted from the Sun.
- D. the diffusion of the light from the stars.

Reporting Category/Subcategory for Item 34: **Earth and Space Sciences/Solar System and Universe (p. 260)**

35. Human blood types A, B, AB, and O are determined by multiple alleles. Assume that one parent has type A blood and is heterozygous (AO) and the other parent has type B blood and is heterozygous (BO). What are the possible blood types of the offspring?

- A. only AB
- B. AB, A, and B
- C. only O
- ✓ D. AB, A, B, and O

Reporting Category/Subcategory for Item 35: Life Sciences/Heredity and Evolution (pp. 258-259)

36. A hydraulic system is used in an automobile in the

- ✓ A. brakes.
- B. fuses.
- C. ignition.
- D. carburetor.

Reporting Category/Subcategory for Item 36: Technology/Understanding and Using Technology (pp. 261-262)

37. Which of the following statements is not true of DNA?

- A. It is made up of four nitrogen bases (adenine, thymine, cytosine, guanine).
- B. It is a double-helix-shaped molecule.
- C. It contains information for protein synthesis.
- ✓ D. It provides energy for most chemical reactions in the cell.

Reporting Category/Subcategory for Item 37: Life Sciences/Heredity and Evolution (pp. 258-259)

Use the periodic table below to answer question 38.

1 H 1.008		Periodic Chart of the Elements																2 He 4.003																			
3 Li 6.94		4 Be 9.01												5 B 10.81		6 C 12.01		7 N 14.01		8 O 16.00		9 F 19.00		10 Ne 20.18													
11 Na 22.99		12 Mg 24.31												13 Al 26.98		14 Si 28.09		15 P 30.97		16 S 32.06		17 Cl 35.45		18 Ar 39.95													
19 K 39.10		20 Ca 40.08		21 Sc 44.96		22 Ti 47.90		23 V 50.94		24 Cr 52.00		25 Mn 54.94		26 Fe 55.85		27 Co 58.93		28 Ni 58.70		29 Cu 63.55		30 Zn 65.38		31 Ga 69.72		32 Ge 72.59		33 As 74.92		34 Se 78.96		35 Br 79.90		36 Kr 83.80			
37 Rb 85.47		38 Sr 87.62		39 Y 88.91		40 Zr 91.22		41 Nb 92.91		42 Mo 95.94		43 Tc (97)		44 Ru 101.07		45 Rh 102.91		46 Pd 106.4		47 Ag 107.87		48 Cd 112.41		49 In 114.82		50 Sn 118.89		51 Sb 121.75		52 Te 127.60		53 I 126.90		54 Xe 131.30			
55 Cs 132.91		56 Ba 137.33		57 *La 138.91		72 Hf 178.49		73 Ta 180.95		74 W 183.85		75 Re 186.21		76 Os 190.2		77 Ir 192.22		78 Pt 195.09		79 Au 196.97		80 Hg 200.59		81 Tl 204.37		82 Pb 207.2		83 Bi 208.98		84 Po (209)		85 At (210)		86 Rn (222)			
87 Fr (223)		88 Ra 226.03		89 **Ac (227)		104 Unq (261)		105 Unp (262)		106 Unh (263)		107 Uns (262)																									
																		*Lanthanide Series																			
58 Ce 140.12		59 Pr 140.91		60 Nd 144.24		61 Pm (147)		62 Sm 150.4		63 Eu 151.96		64 Gd 157.25		65 Tb 158.93		66 Dy 162.50		67 Ho 164.93		68 Er 167.26		69 Tm 168.93		70 Yb 173.04		71 Lu 174.97											
90 Th 232.04		91 Pa 231.04		92 U 238.03		93 Np 237.05		94 Pu (244)		95 Am (243)		96 Cm (247)		97 Bk (247)		98 Cf (251)		99 Es (254)		100 Fm (257)		101 Md (258)		102 No (259)		103 Lr (260)											

38. An element's position on the periodic table does not give us information about an element's
- A. atomic mass.
 - B. reactivity.
 - ✓ C. solubility.
 - D. atomic structure.

Reporting Category/Subcategory for Item 38: *Physical Sciences/Structure of Matter (pp. 256-257)*

39. Each cycle from new moon to new moon takes approximately

- A. four days.
- ✓ B. four weeks.
- C. four months.
- D. four years.

Reporting Category/Subcategory for Item 39: Earth and Space Sciences/Solar System and Universe (p. 260)

40. In many basic manufacturing production processes, jigs and fixtures are used to facilitate the production of a product. Jigs and fixtures serve to

- A. cut a piece and shape a tool.
- ✓ B. hold a piece and guide a tool.
- C. drill a hole and cut a line.
- D. measure a piece and draw a line.

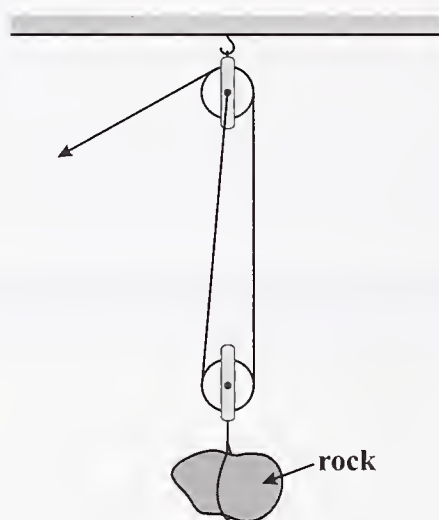
Reporting Category/Subcategory for Item 40: Technology/Understanding and Using Technology (pp. 261-262)

Session 3, Open-response Questions

41. A friend says that one of the problems with using fossil fuels is that oxygen is used in the combustion reaction. If we keep using fossil fuels, your friend argues, all of Earth's oxygen will eventually be gone. Using scientific principles, explain why your friend's statement is incorrect. Be sure to include photosynthesis and the Law of Conservation of Matter in your explanation.

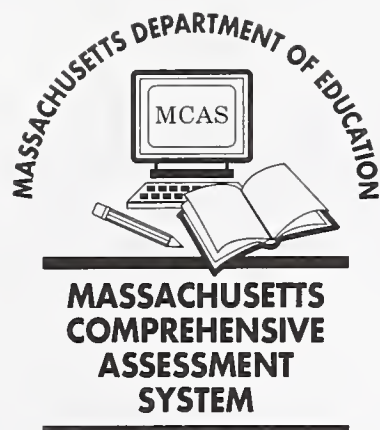
Reporting Category/Subcategory for Item 41: Earth and Space Sciences/Earth Processes (pp. 259-260)

Use the diagram below to answer question 42.



42. A landscaper uses a block and tackle to lift a 3000 newton rock. To lift the rock 2 meters, the cable must be pulled 10 meters with a force of 650 newtons.
- Calculate the amount of work done by the landscaper using the block and tackle (work input) and the work done on the rock lifting it 2 meters (work output).
 - Determine the percent efficiency of the block and tackle system.
 - Explain why the work input is larger than the work output.

Reporting Category/Subcategory for Item 42: Physical Sciences/Position and Motion of Objects (p. 257)



XI. History and Social Science

Grade 8

Massachusetts Department of Education



Curriculum Framework *Learning Standards* *and Core Knowledge Topics/* *MCAS Reporting Categories* *History and Social Science, Grade 8*

The 1999 MCAS History and Social Science test was based on the learning standards and core knowledge topics of the Massachusetts *History and Social Science Curriculum Framework*.⁴⁶ Each test question assessed students' knowledge, concepts, and reasoning related to a specific learning standard; most questions also assessed knowledge, concepts, and reasoning related to a particular core knowledge topic.

Each common item in the second half of this chapter is followed by a reference to the *Framework* study strand, learning standard, and, if applicable, core knowledge topic to which it is related.

Learning Standards

The *Framework* identifies four major study strands:

- History
- Geography
- Economics
- Civics and Government

The learning standards for each study strand are listed below and are directly quoted from the *Framework*; applicable *Framework* page numbers are shown in parentheses.

History (*Framework*, pp. 64–65, 74–75, 78–93)

- 1. Chronology and Cause.** Students will understand the chronological order of historical events and recognize the complexity of historical cause and effect, including the interaction of forces from different spheres of human activity, the importance of ideas, and of individual choices, actions, and character.

⁴⁶ Massachusetts Department of Education, *History and Social Science Curriculum Framework* (Malden, 1997).

- 2. Historical Understanding.** Students will understand the meaning, implications, and import of historical events, while recognizing the contingency and unpredictability of history—how events could have taken other directions—by studying past ideas as they were thought, and past events as they were lived, by people of the time.
- 3. Research, Evidence, and Point of View.** Students will acquire the ability to frame questions that can be answered by historical study and research; to collect, evaluate, and employ information from primary and secondary sources, and to apply it in oral and written presentations. They will understand the many kinds and uses of evidence; and by comparing competing historical narratives, they will differentiate historical fact from historical interpretation and from fiction.
- 4. Society, Diversity, Commonality, and the Individual.** As a vast nation, the overwhelming majority of whose population derives from waves of immigration from many lands, the United States has a citizenry that exhibits a broad diversity in terms of race, ethnic traditions, and religious beliefs. The history of the United States exhibits perhaps the most important endeavor to establish a civilization founded on the principles that all people are created equal, that it is the purpose of government to secure the inalienable rights of all individuals, and that government derives “its just powers from the consent of the governed.” It is also true, however, that federal, state, and local governments, as well as the people themselves, have often fallen short in practice of actualizing these high ideals, the most egregious violation being the acceptance of slavery in some states until the Civil War. Students should be expected to learn of the complex interplay that has existed from the beginning of our country between American ideals and American practice in the pursuit of realizing the goals of the Declaration of Independence for all people. While attending to the distinct contributions that immigrants from various lands and of various creeds, along with Native Americans, have made to our nationhood, students [will understand] above all the importance of our common citizenship and the imperative to treat all individuals with the respect for their dignity called for by the Declaration of Independence.
- 5. Interdisciplinary Learning: Religion, Ethics, Philosophy, and Literature in History.** Students will describe and explain fundamental tenets of major world religions; basic ideals of ethics, including justice, consideration for others, and respect for human rights; differing conceptions of human nature; and influences over time of religion, ethics, and ideas of human nature in the arts, political and economic theories and ideologies, societal norms, education of the public, and the conduct of individual lives.
- 6. Interdisciplinary Learning: Natural Science, Mathematics, and Technology in History.** Students will describe and explain major advances, discoveries, and inventions over time in natural science, mathematics, and technology; explain some of their effects and influences in the past and present on human life, thought, and health, including use of natural resources, production and distribution and consumption of goods, exploration, warfare, and communication.

Geography (Framework, pp. 66–67, 75, 94–101)

- 7. Physical Spaces of the Earth.** Students will describe earth's natural features and their physical and biological characteristics; they will be able to visualize and map oceans and continents; mountain chains and rivers; forest, plain, and desert; resources both above and below ground; and conditions of climate and seasons.
- 8. Places and Regions of the World.** Students will identify and explain the location and features of places and systems organized over time, including boundaries of nations and regions; cities and towns; capitals and commercial centers; roads, rails, and canals; dams, harbors, and fortifications; and routes of trade and invasion.
- 9. The Effects of Geography.** Students will learn how physical environments have influenced particular cultures, economies, and political systems, and how geographic factors have affected population distribution, human migration, and other prehistoric and historical developments, such as agriculture, manufacturing, trade, and transportation.
- 10. Human Alteration of Environments.** Students will describe the ways in which human activity has changed the world, such as removing natural barriers; transplanting some animal and plant species, and eliminating others; increasing or decreasing the fertility of land; and the mining of resources. They explain how science, technology, and institutions of many kinds have affected human capacity to alter environments.

Economics (Framework, pp. 68–71, 75–76, 102–117)

- 11. Fundamental Economic Concepts.** Students will understand fundamental economic concepts, including choice, ownership, exchange, cooperation, competition, purposive effect, entrepreneurship, incentive, and money.
- 12. Economic Reasoning.** Students will demonstrate understanding of supply and demand, price, labor markets, the costs of capital, factors affecting production, distribution, and consumption, relations among such factors, the nature of goods and services, incentives, financial markets, cost-benefit (including marginal cost-benefit) analysis, fairness, and the value of trade.
- 13. American and Massachusetts Economic History.** Students will describe the development of the American economy, including Massachusetts and New England, from colonial times to the present.
- 14. Today's Economy.** Students will describe the distinctive aspects of the contemporary economy of the United States and the world.
- 15. Theories of Economy.** Students will describe and compare the major theories of economy, and will identify the individuals and historical circumstances in which these theories were developed.

Civics and Government (Framework, pp. 72–73, 76–77, 118–130)

- 16. Authority, Responsibility, and Power.** Students will explain forms of authority in government and other institutions; explain purposes of authority and distinguish authority from mere power, as in “a government of laws, but not of men”; and describe responsible and irresponsible exercise of both authority and power.
- 17. The Founding Documents.** Students will learn in progressively greater detail the content and history of the Founding Documents of the United States—the Declaration of Independence, United States Constitution, and selected *Federalist* papers (as required by the Massachusetts Education Reform Act of 1993). They will assess the reasoning, purposes, and effectiveness of the documents; and, similarly, elements of the Constitution of the Commonwealth of Massachusetts.
- 18. Principles and Practices of American Government.** Students will describe how the United States government functions at the local, state, national, and international levels, with attention to the Constitution of the Commonwealth of Massachusetts, its Declaration of the Rights of the Inhabitants, and the basic elements of its Frame of Government; analyze the background and evolution of constitutional and democratic government in the United States to the present day; and explain the place of institutions of government in securing the rights of citizens.
- 19. Citizenship.** Students will learn the rights and duties of citizens and the principle of equal rights for all; consider the nature of civic virtue in a school, a community, a nation; and identify major obstacles and threats to civil rights.
- 20. Forms of Government.** Students will study, compare, contrast, and analyze diverse forms of government; the ways of life and opportunities they permit, promote, and prohibit; and their effects on human rights. They will evaluate forms of government in terms of justice, ordered liberty, efficiency, public safety, educational opportunity, and economic and social mobility.

Core Knowledge Topics

The *History and Social Science Curriculum Framework* groups core knowledge topics into two categories: **The United States** and **The World**. In accordance with the scope and sequence of instruction recommended by the *Framework*, MCAS tests grade 8 students on core knowledge topics from both categories, as listed below; however, no single annual MCAS administration will test **all** core knowledge topics from the grade 8 list.

In the 1999 grade 8 History and Social Science test, each common item based on a *History* strand learning standard was linked to at least one core knowledge topic. Questions based on the other three strands’ learning standards were not necessarily linked to a core knowledge topic; those that assessed only a learning standard are considered “stand alone” items.

Questions within any single History and Social Science test session covered up to two core knowledge topic eras; these questions were not necessarily presented in chronological order. However, the sequence of questions from session to session generally progressed in chronological order by era.

The grade 8 History and Social Science core knowledge topics listed below are directly quoted from pages 13, 14, and 16 of the *Framework*; each topic is further subdivided on those *Framework* pages. Pages 24-50 of the *Framework* additionally list commonly taught subtopics for grade 8 students.

Grade 8 Core Knowledge Topics: The United States

1. Early America and the Americans (Beginnings to 1650)
2. Settlements, Colonies, and Emerging American Identity (1600 to 1763)
3. The American Revolution: Creating a New Nation (1750 to 1815)
4. Expansion, Reform, and Economic Growth (1800 to 1861)
5. The Civil War and Reconstruction (1850 to 1877)

The World

1. Human Beginnings and Early Civilizations (Prehistory to 1000 B.C.)
2. Classical Civilizations of the Ancient World (1000 B.C. to c. 500 A.D.)
3. Growth of Agricultural and Commercial Civilizations (500 to 1500 A.D.)⁴⁷

Reporting Categories

Although MCAS test questions sometimes assess both a *Framework* core knowledge topic and one of the *Geography*, *Economics*, or *Civics and Government* strand learning standards, core knowledge topics are primarily assessed through questions that are linked with the learning standards of the *History* strand. Therefore, school and district results for the grade 8 History and Social Science test will be reported under the following five MCAS reporting categories:

- | | |
|------------------------|--------------------------------|
| ■ <i>U.S. History</i> | ■ <i>Economics</i> |
| ■ <i>World History</i> | ■ <i>Civics and Government</i> |
| ■ <i>Geography</i> | |

Results for items that assess learning standards from the *Geography*, *Economics*, or *Civics and Government* study strands will be reported under those reporting categories, whether or not they also assess a core knowledge topic. Results for items associated with *History* strand learning standards will be reported according to whether the core knowledge topic they also assess is listed under *The United States* or *The World*.

⁴⁷ Grade 8 students are only tested on the first three subdivisions listed in the *Framework* under this core knowledge topic.

MCAS Spring 1999 Common Test Items

History and Social Science, Grade 8

Test Administration Sessions

MCAS grade 8 Student Test Booklets included 3 separate History and Social Science test sessions. Each session included multiple-choice and open-response questions.

Reference Materials and Tools

No reference materials or tools were allowed during any History and Social Science test session.

Stand Alone Items

Items which assess a learning standard, but no core knowledge topic, indicate “NA” (“Not Applicable”) as the related core knowledge topic in the shaded bar following the item.

Session 1, Multiple-choice Questions

1. Which statement about paleolithic hunter-gatherers is true?

- A. They did not form social groups.
- ✓ B. They traveled to find food.
- C. They did not make tools.
- D. They lived in permanent villages.

Item 1

Study Strand and Learning Standard: **History: Historical Understanding** (p. 286)

Core Knowledge Topic: **The World: Human Beginnings and Early Civilizations (Prehistory to 1000 B.C.)** (p. 289)

2. An important difference between the religion of ancient Israel and the religions of ancient Mesopotamia and Egypt was the

- A. written documentation of stories and laws.
- B. building of temples.
- ✓ C. belief in one god rather than many.
- D. separation of religion and government.

Item 2

Study Strand and Learning Standard: **History: Interdisciplinary Learning: Religion, Ethics, Philosophy, and Literature in History** (p. 286)

Core Knowledge Topic: **The World: Classical Civilizations of the Ancient World (1000 B.C. to c. 500 A.D.)** (p. 289)

3. Before Sumerian craftsmen discovered how to make bronze, tools and weapons were made of copper. What is one advantage of using bronze instead of copper for tools and weapons?

- A. The elements that make up bronze are easier to find than copper.
- B. Bronze is much easier to shape into tools than copper.
- ✓ C. Bronze is a much harder metal than copper.
- D. The melting point of bronze is lower than that of copper.

Item 3

Study Strand and Learning Standard: **History: Interdisciplinary Learning: Natural Science, Mathematics, and Technology in History** (p. 286)

Core Knowledge Topic: **The World: Human Beginnings and Early Civilizations (Prehistory to 1000 B.C.)** (p.289)

Read the text below and then answer question 4.

Tell [Agamemnon] to arm his long-haired [Greeks]
to attack at once, full force—
now he can take the broad streets of Troy.
The immortal gods who hold Olympus clash no more,
Hera's appeals have brought them round and all agree:
griefs are about to crush the men of Troy.

4. The above text, which is part of a Greek epic poem, is taken from
- A. Plato's *Republic*.
 - B. Aesop's *Fables*.
 - C. Aristotle's *Poetics*.
 - ✓ D. Homer's *Iliad*.

Item 4

Study Strand and Learning Standard: **History: Interdisciplinary Learning: Religion, Ethics, Philosophy, and Literature in History** (p. 286)

Core Knowledge Topic: **The World: Classical Civilizations of the Ancient World (1000 B.C. to c. 500 A.D.)** (p. 289)

5. The Rosetta Stone is important to historians studying the history of ancient Egypt because it
- ✓ A. helps them read ancient Egyptian writing.
 - B. describes the method for building the pyramids.
 - C. lists all the pharaohs who ruled in Egypt.
 - D. reveals how the Egyptians performed a mummification.

Item 5

Study Strand and Learning Standard: **History: Research, Evidence, and Point of View** (p. 286)

Core Knowledge Topic: **The World: Human Beginnings and Early Civilizations (Prehistory to 1000 B.C.)** (p. 289)

6. Many modern historians cite all the following as reasons for the decline of the Roman Empire in the west **except**
- A. political crises.
 - B. a decline in population.
 - C. barbarian invasions.
 - ✓ D. the abolition of slavery.

Item 6

Study Strand and Learning Standard: **History: Chronology and Cause** (p. 285)

Core Knowledge Topic: **The World: Classical Civilizations of the Ancient World (1000 B.C. to c. 500 A.D.)** (p. 289)

7. Which of the following **best** describes the work of Socrates?
- A. governing the Athenian state during the Persian Wars
 - B. writing a series of plays about Oedipus
 - C. designing most buildings on the Acropolis
 - ✓ D. teaching his followers to seek truth through reason

Item 7

Study Strand and Learning Standard: **History: Interdisciplinary Learning: Religion, Ethics, Philosophy, and Literature in History** (p. 286)

Core Knowledge Topic: **The World: Classical Civilizations of the Ancient World (1000 B.C. to c. 500 A.D.)** (p. 289)

8. Before the first European contact with the North American continent, the functioning of most Native American societies depended **primarily** upon
- A. nuclear families.
 - ✓ B. clans and kinship networks.
 - C. monarchies.
 - D. elective governments.

Item 8

Study Strand and Learning Standard: **History: Historical Understanding** (p. 286)

Core Knowledge Topic: **The United States: Early America and the Americans (Beginnings to 1650)** (p. 289)

9. A historian in the 1990s is researching life in the Massachusetts Bay Colony in the 1630s. The historian finds a sermon and a diary written in the 1630s and includes them in a textbook. Both the sermon and the diary are examples of a
- ✓ A. primary source.
 - B. chronology.
 - C. secondary source.
 - D. biography.

Item 9

Study Strand and Learning Standard: **History: Research, Evidence, and Point of View** (p. 286)

Core Knowledge Topic: **The United States: Early America and the Americans (Beginnings to 1650)** (p. 289)

10. Deposits of decayed plant and animal life millions of years old created North America's vast supply of
- A. sand.
 - B. granite.
 - ✓ C. coal.
 - D. iron ore.

Item 10

Study Strand and Learning Standard: **Geography: Physical Spaces of the Earth** (p. 287)

Core Knowledge Topic: **NA**

11. When inflation occurs, prices
- A. rise because supply exceeds demand.
 - ✓ B. rise because demand exceeds supply.
 - C. fall because supply exceeds demand.
 - D. fall because demand exceeds supply.

Item 11

Study Strand and Learning Standard: **Economics: Fundamental Economic Concepts** (p. 287)

Core Knowledge Topic: **NA**

12. The religious beliefs of Native Americans traditionally
- ✓ A. are based on the idea that nature is spiritually united.
 - B. are based upon the worship of one primary god.
 - C. encourage their followers to construct cathedrals.
 - D. insist that humans have control over nature.

Item 12

Study Strand and Learning Standard: **History: Interdisciplinary Learning: Religion, Ethics, Philosophy, and Literature in History (p. 286)**

Core Knowledge Topic: **The United States: Early America and the Americans (Beginnings to 1650) (p. 289)**

Session 1, Open-response Questions

13. Listed below are four important archeological sites. Select one of the sites; then answer parts a and b.

- Olduvai Gorge in East Africa, where the remains of early hominids dating from 1.8 million years ago have been discovered
- the site of the city of Mohenjo-Daro on the Indus River in India (2500–1500 B.C.)
- an Egyptian tomb dating from the New Kingdom (1554–1075 B.C.)
- the Roman city of Pompeii, destroyed in A.D. 79

- a. Describe one type of archeological evidence that you would most likely find at the site you have chosen.
- b. Explain what can be learned from the evidence.

Item 13

Study Strand and Learning Standard: **History: Research, Evidence, and Point of View** (p. 286)

Core Knowledge Topic: **The World: Human Beginnings and Early Civilizations (Prehistory to 1000 B.C.) and The World: Classical Civilizations of the Ancient World (1000 B.C. to 500 A.D.)** (p.289)

14. In the sixteenth century, a sailor would use an instrument called a cross staff to calculate his position on the ocean. The cross staff was one of many inventions and technologies that contributed to European exploration at that time and later.

Describe the role of any two of the following scientific and technological developments in the European exploration of the Americas between 1500 and 1700.

- compass
- gunpowder
- printing press
- lateen-rigged sails

Item 14

Study Strand and Learning Standard: **History: Interdisciplinary Learning: Natural Science, Mathematics, and Technology in History** (p. 286)

Core Knowledge Topic: **The United States: Early America and the Americans (Beginnings to 1650)** (p. 289)

Session 2, Multiple-choice Questions

Use the illustration to answer question 15.

15. This Paul Revere illustration, widely distributed in colonial America, was meant to show
- ✓ A. British brutality against American colonists in Boston.
 - B. American colonists' brutality against the British in Boston.
 - C. the evils associated with the impressment of American colonial sailors by the British.
 - D. the evils associated with the impressment of British sailors by American colonists.



Item 15

Study Strand and Learning Standard: **History: Historical Understanding** (p. 286)

Core Knowledge Topic: **The United States: The American Revolution: Creating a New Nation (1750 to 1815)** (p. 289)

16. Benjamin Franklin is closely associated with all the following except
- A. demonstrating that lightning is a form of electricity.
 - B. inventing bifocal eyeglasses.
 - C. publishing *Poor Richard's Almanac*.
 - ✓ D. negotiating treaties with Native Americans.

Item 16

Study Strand and Learning Standard: **History: Historical Understanding** (p. 286)

Core Knowledge Topic: **The United States: Settlements, Colonies, and Emerging American Identity (1600 to 1763)** (p. 289)

17. By 1815, the United States' land bordered all the bodies of water below except

- ✓ A. the Pacific Ocean.
- B. Lake Erie.
- C. the Gulf of Mexico.
- D. the Atlantic Ocean.

Item 17

Study Strand and Learning Standard: **Geography: Places and Regions of the World** (p. 287)

Core Knowledge Topic: **The United States: Expansion, Reform, and Economic Growth (1800 to 1861)** (p. 289)

18. The most important foreign ally of the American colonies during the American Revolution was

- A. Spain.
- B. Holland.
- C. Italy.
- ✓ D. France.

Item 18

Study Strand and Learning Standard: **History: Chronology and Cause** (p. 285)

Core Knowledge Topic: **The United States: The American Revolution: Creating a New Nation (1750 to 1815)**
(p. 289)

19. Who was the **principal** author of the Declaration of Independence?

- A. Benjamin Franklin
- B. James Madison
- ✓ C. Thomas Jefferson
- D. George Washington

Item 19

Study Strand and Learning Standard: **Civics and Government: The Founding Documents** (p. 288)

Core Knowledge Topic: **The United States: The American Revolution: Creating a New Nation (1750 to 1815)**
(p. 289)

20. According to the title of his famous pamphlet, Thomas Paine believed that American colonial independence from Great Britain was a matter of
- A. *Divine Right*.
 - B. *States' Rights*.
 - ✓ C. *Common Sense*.
 - D. *Manifest Destiny*.

Item 20

Study Strand and Learning Standard: **History: Historical Understanding** (p.286)

Core Knowledge Topic: **The United States: The American Revolution: Creating a New Nation (1750 to 1815)**
(p. 289)

21. Before the American Revolution, a teacher in Massachusetts might have assigned all the following for students to read **except**
- A. the Bible.
 - B. Shakespearean plays.
 - C. Aesop's *Fables*.
 - ✓ D. *Uncle Tom's Cabin*.

Item 21

Study Strand and Learning Standard: **History: Interdisciplinary Learning: Religion, Ethics, Philosophy, and Literature in History** (p. 286)

Core Knowledge Topic: **The United States: Settlements, Colonies, and Emerging American Identity (1600 to 1763)** (p. 289)

22. American colonists cited all the following grievances against British rule except the

- ✓ A. Northwest Ordinance.
- B. Stamp Act.
- C. Tea Tax.
- D. Boston Massacre.

Item 22

Study Strand and Learning Standard: **History: Chronology and Cause** (p. 285)

Core Knowledge Topic: **The United States: The American Revolution: Creating a New Nation (1750 to 1815)**
(p. 289)

23. Alexander Hamilton and other Federalists supported a high tariff to protect which of the following?

- A. plantation owners
- ✓ B. new industries
- C. small banks
- D. large cities

Item 23

Study Strand and Learning Standard: **Economics: Fundamental Economic Concepts** (p. 287)

Core Knowledge Topic: **The United States: The American Revolution: Creating a New Nation (1750 to 1815)**
(p. 289)

Use the map to answer question 24.

24. The shaded portion of the map shows the

- A. Oregon country.
- B. Gadsden Purchase.
- ✓ C. Louisiana Purchase.
- D. Mexican Cession.



Item 24

Study Strand and Learning Standard: **Geography: Places and Regions of the World** (p. 287)

Core Knowledge Topic: **The United States: The American Revolution: Creating a New Nation (1750 to 1815)**
(p. 289)

25. A colonial New England town meeting was an example of

- A. parliamentary government.
- ✓ B. direct democracy.
- C. representative government.
- D. bicameral government.

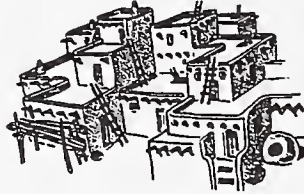
Item 25

Study Strand and Learning Standard: ***Civics and Government: Citizenship*** (p. 288)

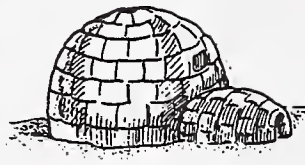
Core Knowledge Topic: ***The United States: Settlements, Colonies, and Emerging American Identity***
(1600 to 1763) (p. 289)

Session 2, Open-response Questions

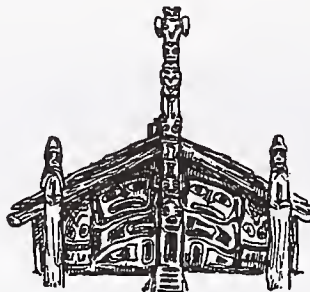
Use the drawings below to answer open-response question 26.



1.



2.



3.



4.

26. Native Americans constructed a wide range of dwellings to adapt to their environments.
- Choose any two of the four dwellings and identify the tribe and region of the country where each was built.
 - Discuss the ways each dwelling you chose represents an adaptation to the local environment and its geographic features.

Item 26

Study Strand and Learning Standard: **Geography: The Effects of Geography** (p. 287)

Core Knowledge Topic: **The United States: Early America and the Americans (Beginnings to 1650)** (p. 289)

27. Select two technological advances from the list below and explain how each contributed to American economic growth prior to the Civil War. Support your answer with specific details.

- steamboats
- canals
- railroads
- cotton gin

Item 27

Study Strand and Learning Standard: **Economics: American and Massachusetts Economic History** (p. 287)

Core Knowledge Topic: **The United States: Expansion, Reform, and Economic Growth (1800 to 1861)** (p. 289)

Session 3, Multiple-choice Questions

28. At the mills in Lowell, MA in the nineteenth century, the Boston Associates manufactured

- A. rifles.
- ✓ B. textiles.
- C. steel.
- D. shoes.

Item 28

Study Strand and Learning Standard: **Economics: American and Massachusetts Economic History** (p. 287)

Core Knowledge Topic: **The United States: Expansion, Reform, and Economic Growth (1800 to 1861)** (p. 289)

29. The United States House of Representatives

- A. includes two members from each state.
- B. includes four members from each state.
- ✓ C. gives representation to each state according to its population size.
- D. gives representation to each state according to its physical size.

Item 29

Study Strand and Learning Standard: **Civics and Government: Principles and Practices of American Government** (p. 288)

Core Knowledge Topic: **NA**

30. During the Blizzard of 1888, more than 90% of the cattle on the Great Plains died from the cold. As a result,

- ✓ A. beef prices in the United States increased.
- B. more people in the East became cattle ranchers.
- C. cattle farming on the Great Plains ceased.
- D. demand for beef increased.

Item 30

Study Strand and Learning Standard: **Economics: Economic Reasoning** (p. 287)

Core Knowledge Topic: **NA**

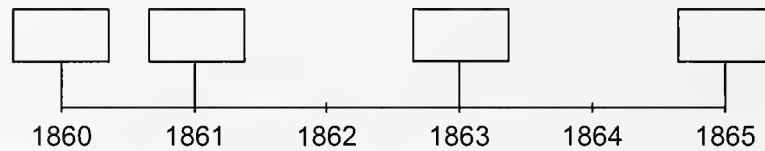
31. Prior to the Civil War, all the following were associated with the growth of a more industrialized urban society in the United States except more
- A. rapid means of transportation.
 - B. rapid means of communication.
 - C. trade with foreign nations.
 - ✓ D. laws restricting immigration.

Item 31

Study Strand and Learning Standard: **History: Chronology and Cause** (p. 285)

Core Knowledge Topic: **The United States: Expansion, Reform, and Economic Growth (1800 to 1861)** (p. 289)

Use the timeline below to answer question 32.



32. Listed below are four events that occurred between 1860 and 1865.

1. The South fires on Fort Sumter.
2. The Battle of Gettysburg occurs.
3. Lee surrenders to Grant at Appomattox.
4. Lincoln is elected president for the first time.

Which series of numbers below lists the four events in correct chronological order?

- A. 1, 4, 2, 3
- B. 1, 2, 4, 3
- ✓ C. 4, 1, 2, 3
- D. 4, 3, 1, 2

Item 32

Study Strand and Learning Standard: **History: Chronology and Cause** (p. 285)

Core Knowledge Topic: **The United States: The Civil War and Reconstruction (1850 to 1877)** (p. 289)

33. The Seneca Falls Declaration issued a call for
- A. the immediate abolition of slavery.
 - ✓ B. women's rights.
 - C. the abolition of property qualifications for voting.
 - D. tax reform.

Item 33

Study Strand and Learning Standard: **History: Society, Diversity, Commonality, and the Individual** (p. 286)

Core Knowledge Topic: **The United States: Expansion, Reform, and Economic Growth (1800 to 1861)** (p. 289)

34. The Bill of Rights was written to prevent the abuses of
- ✓ A. individual citizens by the federal government.
 - B. the federal government by individual citizens.
 - C. state governments by individual citizens.
 - D. state governments by other state governments.

Item 34

Study Strand and Learning Standard: **Civics and Government: Principles and Practices of American Government** (p. 288)

Core Knowledge Topic: **The United States: The American Revolution: Creating a New Nation (1750 to 1815)** (p. 289)

35. An abolitionist would have been pleased about all of the following except the
- A. Emancipation Proclamation.
 - ✓ B. Dred Scott decision.
 - C. Union's victory at Gettysburg.
 - D. publication of *Uncle Tom's Cabin*.

Item 35

Study Strand and Learning Standard: **History: Research, Evidence, and Point of View** (p. 286)

Core Knowledge Topic: **The United States: The Civil War and Reconstruction (1850 to 1877)** (p. 289)

Read the quotation below to answer question 36.

With malice toward none, with charity for all, with firmness in the right as God gives us to see the right, let us strive on to finish the work we are in, to bind up the nation's wounds, to care for him who shall have borne the battle and for his widow and his orphan. . .

36. These words were spoken by

- A. George Washington as the American Revolution was ending.
- B. James Madison as the War of 1812 was ending.
- C. James Polk as the Mexican War was ending.
- ✓ D. Abraham Lincoln as the Civil War was ending.

Item 36

Study Strand and Learning Standard: **History: Society, Diversity, Commonality, and the Individual** (p. 286)

Core Knowledge Topic: **The United States: The Civil War and Reconstruction (1850 to 1877)** (p. 289)

37. In which group below was **everyone** an abolitionist?

- A. Andrew Jackson, William Lloyd Garrison, Frederick Douglass
- ✓ B. William Lloyd Garrison, Frederick Douglass, Harriet Tubman
- C. George Washington, William Lloyd Garrison, Frederick Douglass
- D. Thomas Jefferson, William Lloyd Garrison, Harriet Tubman

Item 37

Study Strand and Learning Standard: **History: Chronology and Cause** (p. 285)

Core Knowledge Topic: **The United States: Expansion, Reform, and Economic Growth (1800 to 1861)** (p. 289)

38. By the end of the Civil War, which region of the United States was well-established as its “breadbasket”?

- A. the southwest
- ✓ B. the midwest
- C. the south
- D. the northwest

Item 38

Study Strand and Learning Standard: ***Geography: The Effects of Geography*** (p. 287)

Core Knowledge Topic: ***The United States: The Civil War and Reconstruction (1850 to 1877)*** (p. 289)

Session 3, Open-response Question

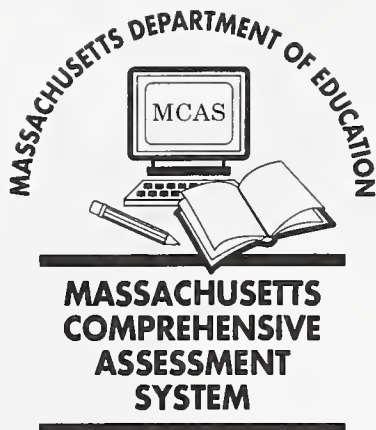
39. Explain how two of the following helped the Union win the Civil War.

- The Battle of Gettysburg
- Industrial Production
- The Emancipation Proclamation
- Ulysses S. Grant

Item 39

Study Strand and Learning Standard: **History: Historical Understanding** (p. 286)

Core Knowledge Topic: **The United States: The Civil War and Reconstruction (1850 to 1877)** (p. 289)



XII. History and Social Science

Grade 10

Massachusetts Department of Education

Curriculum Framework *Learning Standards* *and Core Knowledge Topics/* *MCAS Reporting Categories* *History and Social Science, Grade 10*

The 1999 MCAS History and Social Science test was based on the learning standards and core knowledge topics of the Massachusetts *History and Social Science Curriculum Framework*.⁴⁸ Each test question assessed students' knowledge, concepts, and reasoning related to a specific learning standard; most questions also assessed knowledge, concepts, and reasoning related to a particular core knowledge topic.

Each common item in the second half of this chapter is followed by a reference to the *Framework* study strand, learning standard, and, if applicable, core knowledge topic to which it is related.

Learning Standards

The *Framework* identifies four major study strands:

- History
- Geography
- Economics
- Civics and Government

The learning standards for each study strand are listed below and are directly quoted from the *Framework*; applicable *Framework* page numbers are shown in parentheses.

History (*Framework*, pp. 64–65, 74–75, 78–93)

- 1. Chronology and Cause.** Students will understand the chronological order of historical events and recognize the complexity of historical cause and effect, including the interaction of forces from different spheres of human activity, the importance of ideas, and of individual choices, actions, and character.

⁴⁸ Massachusetts Department of Education, *History and Social Science Curriculum Framework* (Malden, 1997).

- 2. Historical Understanding.** Students will understand the meaning, implications, and import of historical events, while recognizing the contingency and unpredictability of history—how events could have taken other directions—by studying past ideas as they were thought, and past events as they were lived, by people of the time.
- 3. Research, Evidence, and Point of View.** Students will acquire the ability to frame questions that can be answered by historical study and research; to collect, evaluate, and employ information from primary and secondary sources, and to apply it in oral and written presentations. They will understand the many kinds and uses of evidence; and by comparing competing historical narratives, they will differentiate historical fact from historical interpretation and from fiction.
- 4. Society, Diversity, Commonality, and the Individual.** As a vast nation, the overwhelming majority of whose population derives from waves of immigration from many lands, the United States has a citizenry that exhibits a broad diversity in terms of race, ethnic traditions, and religious beliefs. The history of the United States exhibits perhaps the most important endeavor to establish a civilization founded on the principles that all people are created equal, that it is the purpose of government to secure the inalienable rights of all individuals, and that government derives “its just powers from the consent of the governed.” It is also true, however, that federal, state, and local governments, as well as the people themselves, have often fallen short in practice of actualizing these high ideals, the most egregious violation being the acceptance of slavery in some states until the Civil War. Students should be expected to learn of the complex interplay that has existed from the beginning of our country between American ideals and American practice in the pursuit of realizing the goals of the Declaration of Independence for all people. While attending to the distinct contributions that immigrants from various lands and of various creeds, along with Native Americans, have made to our nationhood, students [will understand] above all the importance of our common citizenship and the imperative to treat all individuals with the respect for their dignity called for by the Declaration of Independence.
- 5. Interdisciplinary Learning: Religion, Ethics, Philosophy, and Literature in History.** Students will describe and explain fundamental tenets of major world religions; basic ideals of ethics, including justice, consideration for others, and respect for human rights; differing conceptions of human nature; and influences over time of religion, ethics, and ideas of human nature in the arts, political and economic theories and ideologies, societal norms, education of the public, and the conduct of individual lives.
- 6. Interdisciplinary Learning: Natural Science, Mathematics, and Technology in History.** Students will describe and explain major advances, discoveries, and inventions over time in natural science, mathematics, and technology; explain some of their effects and influences in the past and present on human life, thought, and health, including use of natural resources, production and distribution and consumption of goods, exploration, warfare, and communication.

Geography (Framework, pp. 66–67, 75, 94–101)

- 7. Physical Spaces of the Earth.** Students will describe earth's natural features and their physical and biological characteristics; they will be able to visualize and map oceans and continents; mountain chains and rivers; forest, plain, and desert; resources both above and below ground; and conditions of climate and seasons.
- 8. Places and Regions of the World.** Students will identify and explain the location and features of places and systems organized over time, including boundaries of nations and regions; cities and towns; capitals and commercial centers; roads, rails, and canals; dams, harbors, and fortifications; and routes of trade and invasion.
- 9. The Effects of Geography.** Students will learn how physical environments have influenced particular cultures, economies, and political systems, and how geographic factors have affected population distribution, human migration, and other prehistoric and historical developments, such as agriculture, manufacturing, trade, and transportation.
- 10. Human Alteration of Environments.** Students will describe the ways in which human activity has changed the world, such as removing natural barriers; transplanting some animal and plant species, and eliminating others; increasing or decreasing the fertility of land; and the mining of resources. They explain how science, technology, and institutions of many kinds have affected human capacity to alter environments.

Economics (Framework, pp. 68–71, 75–76, 102–117)

- 11. Fundamental Economic Concepts.** Students will understand fundamental economic concepts, including choice, ownership, exchange, cooperation, competition, purposive effect, entrepreneurship, incentive, and money.
- 12. Economic Reasoning.** Students will demonstrate understanding of supply and demand, price, labor markets, the costs of capital, factors affecting production, distribution, and consumption, relations among such factors, the nature of goods and services, incentives, financial markets, cost-benefit (including marginal cost-benefit) analysis, fairness, and the value of trade.
- 13. American and Massachusetts Economic History.** Students will describe the development of the American economy, including Massachusetts and New England, from colonial times to the present.
- 14. Today's Economy.** Students will describe the distinctive aspects of the contemporary economy of the United States and the world.
- 15. Theories of Economy.** Students will describe and compare the major theories of economy, and will identify the individuals and historical circumstances in which these theories were developed.

Civics and Government (Framework, pp. 72–73, 76–77, 118–130)

- 16. Authority, Responsibility, and Power.** Students will explain forms of authority in government and other institutions; explain purposes of authority and distinguish authority from mere power, as in “a government of laws, but not of men”; and describe responsible and irresponsible exercise of both authority and power.
- 17. The Founding Documents.** Students will learn in progressively greater detail the content and history of the Founding Documents of the United States—the Declaration of Independence, United States Constitution, and selected *Federalist* papers (as required by the Massachusetts Education Reform Act of 1993). They will assess the reasoning, purposes, and effectiveness of the documents; and, similarly, elements of the Constitution of the Commonwealth of Massachusetts.
- 18. Principles and Practices of American Government.** Students will describe how the United States government functions at the local, state, national, and international levels, with attention to the Constitution of the Commonwealth of Massachusetts, its Declaration of the Rights of the Inhabitants, and the basic elements of its Frame of Government; analyze the background and evolution of constitutional and democratic government in the United States to the present day; and explain the place of institutions of government in securing the rights of citizens.
- 19. Citizenship.** Students will learn the rights and duties of citizens and the principle of equal rights for all; consider the nature of civic virtue in a school, a community, a nation; and identify major obstacles and threats to civil rights.
- 20. Forms of Government.** Students will study, compare, contrast, and analyze diverse forms of government; the ways of life and opportunities they permit, promote, and prohibit; and their effects on human rights. They will evaluate forms of government in terms of justice, ordered liberty, efficiency, public safety, educational opportunity, and economic and social mobility.

Core Knowledge Topics

The *History and Social Science Curriculum Framework* groups core knowledge topics into two categories: **The United States** and **The World**. In accordance with the scope and sequence of instruction recommended by the *Framework*, MCAS tests grade 10 students beginning with the third topic of the core knowledge grouping, The World, as listed below; however, no single annual MCAS administration will test all core knowledge topics from the grade 10 list.⁴⁹

In the 1999 grade 10 History and Social Science test, each common item (with one exception) based on a History strand learning standard was linked to at least one core knowledge topic.⁵⁰ Questions based on the other three strands’ learning standards were not necessarily linked to a core knowledge topic; those that assessed only a learning standard are considered “stand alone” items.

⁴⁹ Any test items about the United States involved the United States as it relates to the “world stage.”

⁵⁰ One grade 10 common item, item 27 on page 329, is classified as a “stand alone” History strand item.

Questions within any single History and Social Science test session covered up to two core knowledge topic eras; these questions were not necessarily presented in chronological order. However, the sequence of questions from session to session generally progressed in chronological order by era.

The grade 10 History and Social Science core knowledge topics listed below are directly quoted from pages 16 and 17 of the *Framework*; each topic is further subdivided on those *Framework* pages. Pages 24-50 of the *Framework* additionally list commonly taught subtopics for grade 10 students.

Grade 10 Core Knowledge Topics: The World

3. Growth of Agricultural and Commercial Civilizations (500 to 1500 A.D.)
4. Emergence of a Global Age (1450 to 1750)
5. The Age of Revolutionary Change (1700 to 1914)
6. The World in the Era of Great Wars (1900 to 1945)
7. The World from 1945 to the Present⁵¹

Reporting Categories

Results for the grade 10 History and Social Science test will be reported only at the student level in the *History and Social Science Test Item Analysis Reports* issued to schools and districts. No aggregated results will be reported for schools or districts, and no performance level or scaled score results will be reported for individual students, schools, or districts. Each common item is coded on *Test Item Analysis Reports* based on the study strand of the learning standard it assesses. Items are coded under the following four MCAS reporting categories:

■ *World History*

■ *Economics*

■ *Geography*

■ *Civics and Government*

⁵¹ Certain subtopics in this era will be assessed through matrix-sampled test items only. Matrix-sampled test items are the questions that differ between the 12 forms of the test for each grade level; they comprise approximately 20% of the total questions on each test form. Please refer to the section titled "Common Items/Matrix-sampled Items" on pages 4–6 of this document for further information about matrix-sampled questions and reporting of MCAS results in 1999.

MCAS Spring 1999 Common Test Items

History and Social Science, Grade 10

Test Administration Sessions

MCAS grade 10 Student Test Booklets included 3 separate History and Social Science test sessions. Each session included multiple-choice and open-response questions.

Reference Materials and Tools

No reference materials or tools were allowed during any History and Social Science test session.

Stand Alone Items

Items which assess a learning standard, but no core knowledge topic, indicate “NA” (“Not Applicable”) as the related core knowledge topic in the shaded bar following the item.

Session 1, Multiple-choice Questions

1. The Byzantine Empire did **not** experience the conflicts between church and state that were common in medieval Europe because
- A. the spread of literacy destroyed the power of the Byzantine church.
 - B. most of the population of the Byzantine Empire converted to Islam.
 - C. the Byzantine church was too weak to become a source of power.
 - ✓ D. the Byzantine emperor played a direct role in the administration of the church.

Item 1

Study Strand and Learning Standard: **History: Historical Understanding** (p. 312)

Core Knowledge Topic: **The World: Growth of Agricultural and Commercial Civilizations (500 to 1500 A.D.)**
(p. 315)

2. Which agricultural practice contributed to the prosperity of the Inca Empire?
- A. use of a wheeled plow
 - ✓ B. terracing of mountain slopes
 - C. reclamation of swampland
 - D. reliance on cattle and sheep

Item 2

Study Strand and Learning Standard: **Geography: Human Alteration of Environments** (p. 313)

Core Knowledge Topic: **The World: Growth of Agricultural and Commercial Civilizations (500 to 1500 A.D.)**
(p. 315)

Use the map to answer question 3.

3. Which number on the map identifies the location of the Empire of Mali in 1300?
- A. 1
 - B. 2
 - ✓ C. 3
 - D. 4



Item 3

Study Strand and Learning Standard: **Geography: Places and Regions of the World** (p. 313)

Core Knowledge Topic: **The World: Growth of Agricultural and Commercial Civilizations (500 to 1500 A.D.)**
(p. 315)

4. Islamic culture most influenced medieval Europe by
- A. introducing the West to Chinese thought and philosophy.
 - ✓ B. contributing new discoveries in medicine and science.
 - C. preserving the principles and practice of Roman architecture and construction.
 - D. providing models for city government.

Item 4

Study Strand and Learning Standard: **History: Society, Diversity, Commonality, and the Individual** (p. 312)

Core Knowledge Topic: **The World: Growth of Agricultural and Commercial Civilizations (500 to 1500 A.D.)**
(p. 315)

5. The revival and growth of trade between Europe and the East was one lasting effect of the
- ✓ A. Crusades.
 - B. Inquisition.
 - C. Enlightenment.
 - D. Reformation.

Item 5

Study Strand and Learning Standard: **History: Chronology and Cause (p. 311)**

Core Knowledge Topic: ***The World: Growth of Agricultural and Commercial Civilizations (500 to 1500 A.D.)***
(p. 315)

6. The Song Dynasty in China was brought to an end in the thirteenth century by
- A. an extended civil war.
 - ✓ B. the Mongol invasion.
 - C. economic collapse.
 - D. a military revolt.

Item 6

Study Strand and Learning Standard: **History: Chronology and Cause (p. 311)**

Core Knowledge Topic: ***The World: Growth of Agricultural and Commercial Civilizations (500 to 1500 A.D.)***
(p. 315)

7. The Justinian Code compiled during the time of the Byzantine Empire served to
- A. establish the principle that the ruler is subject to the law.
 - B. create a distinct separation between church and state.
 - ✓ C. preserve Roman legal principles and practices.
 - D. introduce Islamic legal traditions to Western Europe.

Item 7

Study Strand and Learning Standard: **History: Historical Understanding (p. 312)**

Core Knowledge Topic: ***The World: Growth of Agricultural and Commercial Civilizations (500 to 1500 A.D.)***
(p. 315)

8. Archaeologists believe that Mayan cities served primarily as
- A. seaports.
 - B. agricultural areas.
 - C. fortresses.
 - ✓ D. religious centers.

Item 8

Study Strand and Learning Standard: **History: Historical Understanding (p. 312)**

Core Knowledge Topic: **The World: Growth of Agricultural and Commercial Civilizations (500 to 1500 A.D.) (p. 315)**

9. In the sixteenth century, one effect of European contact with the Americas was the
- A. introduction of corn and other food crops to the Americas.
 - B. widespread destruction of the rain forests by the early Spanish settlers.
 - C. development of a road system throughout the former Inca Empire.
 - ✓ D. introduction of diseases that greatly reduced the Native American population.

Item 9

Study Strand and Learning Standard: **Geography: Human Alteration of Environments (p. 313)**

Core Knowledge Topic: **The World: Emergence of a Global Age (1450 to 1750) (p. 315)**

10. A government led by religious officials is
- ✓ A. a theocracy.
 - B. an oligarchy.
 - C. a monarchy.
 - D. an aristocracy.

Item 10

Study Strand and Learning Standard: **Civics and Government: Forms of Government (p. 314)**

Core Knowledge Topic: **NA**

11. The large amounts of gold and silver brought to Europe in the sixteenth century from the Americas contributed to
- A. the beginning of the Industrial Revolution.
 - ✓ B. inflation throughout Europe.
 - C. a barter economy in Europe.
 - D. a decrease in the price of goods in Europe.

Item 11

Study Strand and Learning Standard: **Economics: Fundamental Economic Concepts** (p. 313)

Core Knowledge Topic: **The World: Emergence of a Global Age (1450 to 1750)** (p. 315)

Session 1, Open-response Questions

12. At the time of first European contact, two complex civilizations flourished in the Americas—the Aztecs in Mexico and the Incas in Peru. Choose **two** areas from the list below. Describe the characteristics of both cultures in each area.

- military history
- social organization
- political structures
- economic organization
- religion
- art and architecture

Item 12

Study Strand and Learning Standard: **History: Interdisciplinary Learning: Religion, Ethics, Philosophy, and Literature in History (p. 310)**

Core Knowledge Topic: **The World: Growth of Agricultural and Commercial Civilizations (500 to 1500 A.D.) (p. 313)**

13. Imagine that the United States Post Office issued a 33-cent stamp to honor Willie Wells' election to the National Baseball Hall of Fame. The first 50,000 from the several million stamps issued by the Post Office contained a spelling error. People who bought these stamps are now selling them for \$5.00 apiece.

Explain in economic terms why the value of the stamps increased.

Item 13

Study Strand and Learning Standard: **Economics: Economic Reasoning (p. 311)**

Core Knowledge Topic: **NA**

Session 2, Multiple-choice Questions

14. Which invention aided Martin Luther in his struggles against the Roman Catholic Church?

- ✓ A. the printing press
- B. the crossbow
- C. gunpowder
- D. the flying buttress

Item 14

Study Strand and Learning Standard: **History: Interdisciplinary Learning: Natural Science, Mathematics, and Technology in History** (p. 312)

Core Knowledge Topic: **The World: Emergence of a Global Age (1450 to 1750)** (p. 315)

15. The Petition of Right that the English Parliament forced King Charles I to sign in 1628 included the principle of *habeas corpus*, which means that

- A. only a legislative body can collect taxes in time of peace.
- B. civil law cannot apply to the clergy.
- C. martial law can only be applied by the head of the government.
- ✓ D. no one can be imprisoned unless charged with a specific crime within a reasonable time.

Item 15

Study Strand and Learning Standard: **Civics and Government: Principles and Practices of American Government** (p. 314)

Core Knowledge Topic: **The World: Emergence of a Global Age (1450 to 1750)** (p. 315)

16. In the 1600s, how did joint-stock companies such as the Dutch East India Company operate?

- A. The government controlled all the assets of the company.
- ✓ B. Investors bought shares in the company and received a portion of profits.
- C. One major investor held all of the stock of several companies.
- D. Only the Board of Directors shared in the profits of the company.

Item 16

Study Strand and Learning Standard: **Economics: Fundamental Economic Concepts** (p. 313)

Core Knowledge Topic: **The World: Emergence of a Global Age (1450 to 1750)** (p. 315)

Read the passage and then answer question 17.

Nevertheless a prince ought to inspire fear in such a way that, if he does not win love, he avoids hatred; because he can endure very well being feared whilst he is not hated, which will always be as long as he abstains from the property of his citizens and subjects . . .

17. This passage is from the writings of

- A. Michelangelo.
- B. Petrarch.
- C. Erasmus.
- ✓ D. Machiavelli.

Item 17

Study Strand and Learning Standard: **History: Interdisciplinary Learning: Religion, Ethics, Philosophy, and Literature in History (p. 312)**

Core Knowledge Topic: **The World: Emergence of a Global Age (1450 to 1750) (p. 315)**

18. Which individual led independence movements in nineteenth-century South America?

- ✓ A. Simon Bolivar
- B. Fidel Castro
- C. Francisco Pizarro
- D. Gustavus Adolphus

Item 18

Study Strand and Learning Standard: **History: Historical Understanding (p. 312)**

Core Knowledge Topic: **The World: The Age of Revolutionary Change (1700 to 1914) (p. 315)**

19. Thomas Hobbes, John Locke, and Jean-Jacques Rousseau would all most likely agree with which statement?

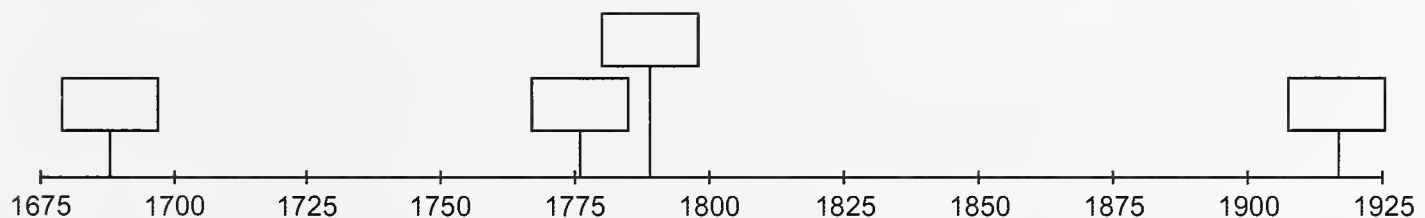
- A. The state should maintain a strong military to ensure domestic order.
- B. The state should share political power with the church.
- ✓ C. The state should exist for the welfare of all the people.
- D. The state should limit free speech for the sake of order.

Item 19

Study Strand and Learning Standard: **Civics and Government: Principles and Practices of American Government** (p. 314)

Core Knowledge Topic: **The World: The Age of Revolutionary Change (1700 to 1914)** (p. 315)

Put the number for each of the following events in the correct box on the timeline below.



- 1. French Revolution begins
 - 2. Russian Revolution begins
 - 3. Declaration of Independence justifies American Revolution
 - 4. Glorious Revolution drives James II from throne
20. Which sequence below lists the four events in correct chronological order?

- A. 1-2-3-4
- B. 3-2-1-4
- ✓ C. 4-3-1-2
- D. 2-1-3-4

Item 20

Study Strand and Learning Standard: **History: Chronology and Cause** (p. 311)

Core Knowledge Topic: **The World: Emergence of a Global Age (1450 to 1750),
The World: The Age of Revolutionary Change (1700 to 1914), and
The World: The World in the Era of Great Wars (1900 to 1945)** (p. 315)

21. Which of these statements is **not** characteristic of Enlightenment thinking?

- A. Reason is the most valuable tool for scientific discovery.
- B. The universe runs according to understandable natural laws.
- C. People can and should make society better.
- ✓ D. God intervenes frequently and unpredictably in human affairs.

Item 21

Study Strand and Learning Standard: **History: Interdisciplinary Learning: Natural Science, Mathematics, and Technology in History (p. 312)**

Core Knowledge Topic: **The World: The Age of Revolutionary Change (1700 to 1914) (p. 315)**

22. All the following characterized nineteenth-century industrialization except

- A. child labor.
- B. long working hours.
- ✓ C. elimination of private property.
- D. rapid population growth.

Item 22

Study Strand and Learning Standard: **History: Chronology and Cause (p. 311)**

Core Knowledge Topic: **The World: The Age of Revolutionary Change (1700 to 1914) (p. 315)**

23. In 1853, Commodore Matthew Perry used the threat of American naval power to open trade with

- A. China.
- B. Russia.
- C. Cuba.
- ✓ D. Japan.

Item 23

Study Strand and Learning Standard: **History: Historical Understanding (p. 312)**

Core Knowledge Topic: **The World: The Age of Revolutionary Change (1700 to 1914) (p. 315)**

24. According to the theory of supply and demand, a large increase in the supply of copper will
- A. decrease the worldwide demand for copper.
 - B. increase the world price for copper.
 - ✓ C. decrease the world price for copper.
 - D. increase the worldwide demand for copper.

Item 24

Study Strand and Learning Standard: **Economics: Economic Reasoning (p. 313)**

Core Knowledge Topic: NA

Session 2, Open-response Questions

25. A historian has described the Scientific Revolution of the seventeenth and eighteenth centuries as “weighing, measuring, and taking the temperature of the world.”

Listed below are inventions from the time of the Scientific Revolution. Select one invention and explain how it contributed to an improved understanding of nature and the universe.

- telescope
- microscope
- pendulum clock
- thermometer

Item 25

Study Strand and Learning Standard: **History: Interdisciplinary Learning: Natural Science, Mathematics, and Technology in History (p. 312)**

Core Knowledge Topic: ***The World: The Age of Revolutionary Change (1700 to 1914) (p. 315)***

26. The Industrial Revolution in Europe was a turning point in modern history. Identify and explain two examples of how the Industrial Revolution in Europe changed the social and economic lives of the people.

Item 26

Study Strand and Learning Standard: **History: Historical Understanding (p. 312)**

Core Knowledge Topic: ***The World: The Age of Revolutionary Change (1700 to 1914) (p. 315)***

Session 3, Multiple-choice Questions

27. A person who was born in 1781 and who died in 1816 lived in the

- A. fifteenth and sixteenth centuries.
- B. sixteenth and seventeenth centuries.
- C. seventeenth and eighteenth centuries.
- ✓ D. eighteenth and nineteenth centuries.

Item 27

Study Strand and Learning Standard: **History: Research, Evidence, and Point of View** (p. 312)

Core Knowledge Topic: **NA** [Note: This item is the only "stand alone" History item.]

28. After World War I, the victorious allies met at Versailles and drew up a peace treaty which, among other provisions, established several new nations in Europe. These new nations included

- A. East Germany and Liechtenstein.
- ✓ B. Yugoslavia and Czechoslovakia.
- C. Austria and Italy.
- D. Bulgaria and Hungary.

Item 28

Study Strand and Learning Standard: **History: Chronology and Cause** (p. 311)

Core Knowledge Topic: **The World: The World in the Era of Great Wars (1900 to 1945)** (p. 315)

29. The League of Nations was established to keep peace in the world by applying the principles of

- A. economic competition.
- B. mercantilism.
- ✓ C. collective security.
- D. fascism.

Item 29

Study Strand and Learning Standard: **History: Historical Understanding** (p. 312)

Core Knowledge Topic: **The World: The World in the Era of Great Wars (1900 to 1945)** (p. 315)

30. Which statement best describes the economic differences between fascists and communists?

- ✓ A. Fascists generally support business owners, while communists oppose them.
- B. Communists generally support business owners, while fascists oppose them.
- C. Fascists oppose colonial expansion, while communists support it.
- D. Communists oppose high taxes, while fascists support them.

Item 30

Study Strand and Learning Standard: **Economics: Theories of Economy** (p. 313)

Core Knowledge Topic: **The World: The World in the Era of Great Wars (1900 to 1945)** (p. 315)

31. To achieve popular support in the elections of the early 1930s, Adolf Hitler pledged to

- ✓ A. destroy the power of liberals, communists, and Jewish citizens.
- B. give women legal equality.
- C. improve relations with France.
- D. withdraw Germany from the League of Nations.

Item 31

Study Strand and Learning Standard: **History: Society, Diversity, Commonality, and the Individual** (p. 312)

Core Knowledge Topic: **The World: The World in the Era of Great Wars (1900 to 1945)** (p. 315)

32. President Harry Truman explained his decision to drop atomic bombs on Japan in August 1945 by citing

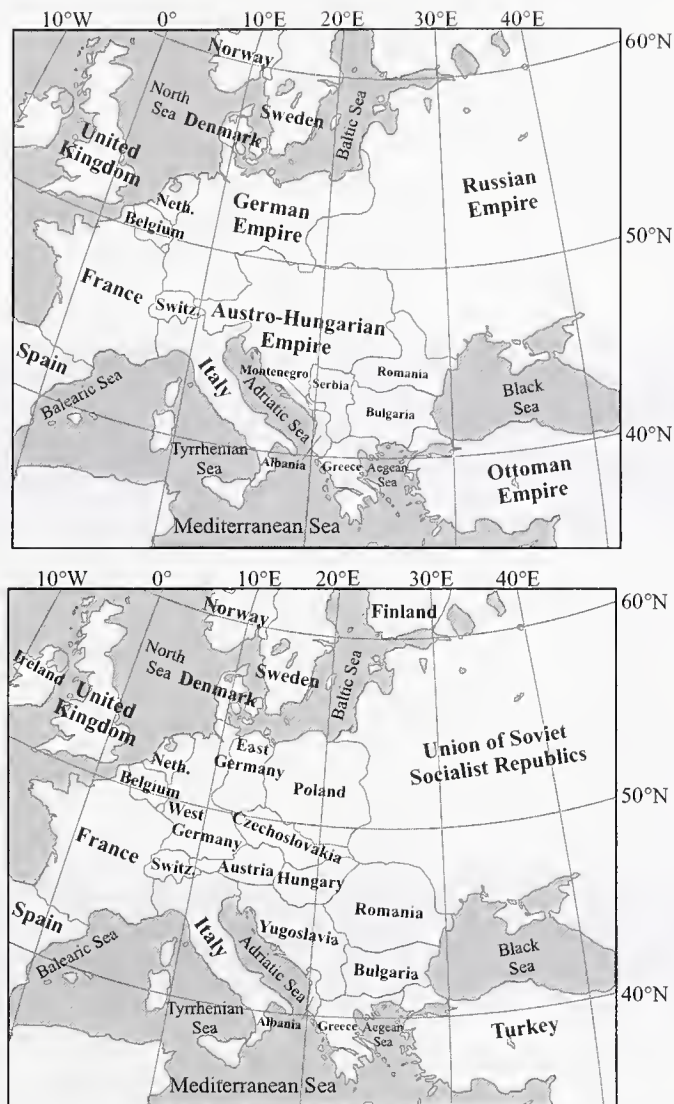
- A. fears of the scientists who developed the bomb that it might not work.
- ✓ B. military estimates that an invasion of Japan would cost many American lives.
- C. angry American sentiment that Japan must be punished for starting World War II.
- D. his own fear that he would not be re-elected if he did not do something dramatic.

Item 32

Study Strand and Learning Standard: **History: Research, Evidence, and Point of View** (p. 312)

Core Knowledge Topic: **The World: The World in the Era of Great Wars (1900 to 1945)** (p. 315)

Use the maps below to answer question 33.



33. The most accurate title for the maps above is

- A. Europe in 1848 and 1914.
- ✓ B. Europe in 1914 and 1948.
- C. Europe in 1948 and 1960.
- D. Europe in 1960 and 1993.

Item 33

Study Strand and Learning Standard: **Geography: Places and Regions of the World** (p. 313)

Core Knowledge Topic: **The World: The World in the Era of Great Wars** (1900 to 1945) (p. 315)

34. Which twentieth century anti-colonial leader is correctly paired with the country he helped to gain independence?

- A. Ho Chi Minh—China
- B. Jomo Kenyatta—Ghana
- ✓ C. Mohandas Gandhi—India
- D. Sun Yat-sen—Japan

Item 34

Study Strand and Learning Standard: **History: Chronology and Cause (p. 311)**

Core Knowledge Topic: **The World: The World in the Era of Great Wars (1900 to 1945) (p. 315)**

35. Women in most western industrialized democracies achieved the right to vote in the

- A. mid-nineteenth century.
- B. late nineteenth century.
- ✓ C. early twentieth century.
- D. mid-twentieth century.

Item 35

Study Strand and Learning Standard: **History: Chronology and Cause (p. 311)**

Core Knowledge Topic: **The World: The Age of Revolutionary Change (1700 to 1914) (p. 315)**

36. Bosnia and Serbia are located in the region known as

- ✓ A. the Balkans.
- B. Iberia.
- C. Scandinavia.
- D. the Rhineland.

Item 36

Study Strand and Learning Standard: **Geography: Physical Spaces of the Earth (p. 313)**

Core Knowledge Topic: **NA**

37. In 1962, the United States and the Soviet Union came close to war over the placement of missiles in
- A. Afghanistan.
 - B. Iraq.
 - C. China.
 - ✓ D. Cuba.

Item 37

Study Strand and Learning Standard: **History: Chronology and Cause (p. 311)**

Core Knowledge Topic: **The World: The World from 1945 to the Present (p. 315)**

Session 3, Open-response Questions

38. Historians contend that the Treaty of Versailles, which concluded World War I, unintentionally “sowed the seeds” of World War II. Explain what historians mean by this statement by describing the effects of any **two** of these treaty terms on Germany.

- reparations Germany was forced to pay
- redrawing of national borders
- disarming of Germany
- war guilt clause

Item 38

Study Strand and Learning Standard: **History: Historical Understanding** (p. 312)

Core Knowledge Topic: **The World: The World in the Era of Great Wars (1900 to 1945)** (p. 315)

39. The dictators listed below rose to power after World War I. Choose **one** of the dictators and then answer the questions that follow.

- Benito Mussolini
- Adolf Hitler
- Francisco Franco

a. Identify the political objectives of the dictator you chose.

b. Describe the tactics used by the dictator and how these tactics served to gain and expand his power.

Item 39

Study Strand and Learning Standard: **Civics and Government: Authority, Responsibility, and Power** (p. 314)

Core Knowledge Topic: **The World: The World in the Era of Great Wars (1900 to 1945)** (p. 315)



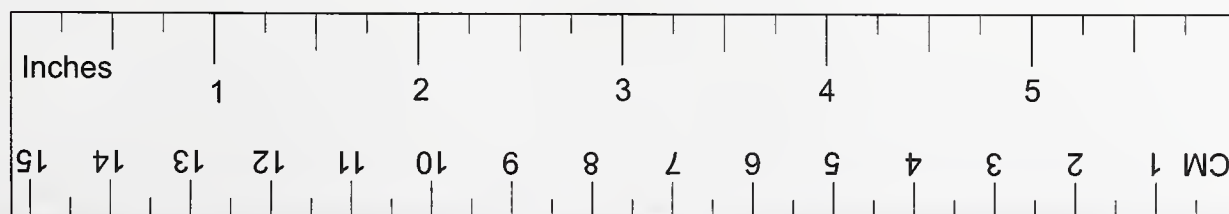
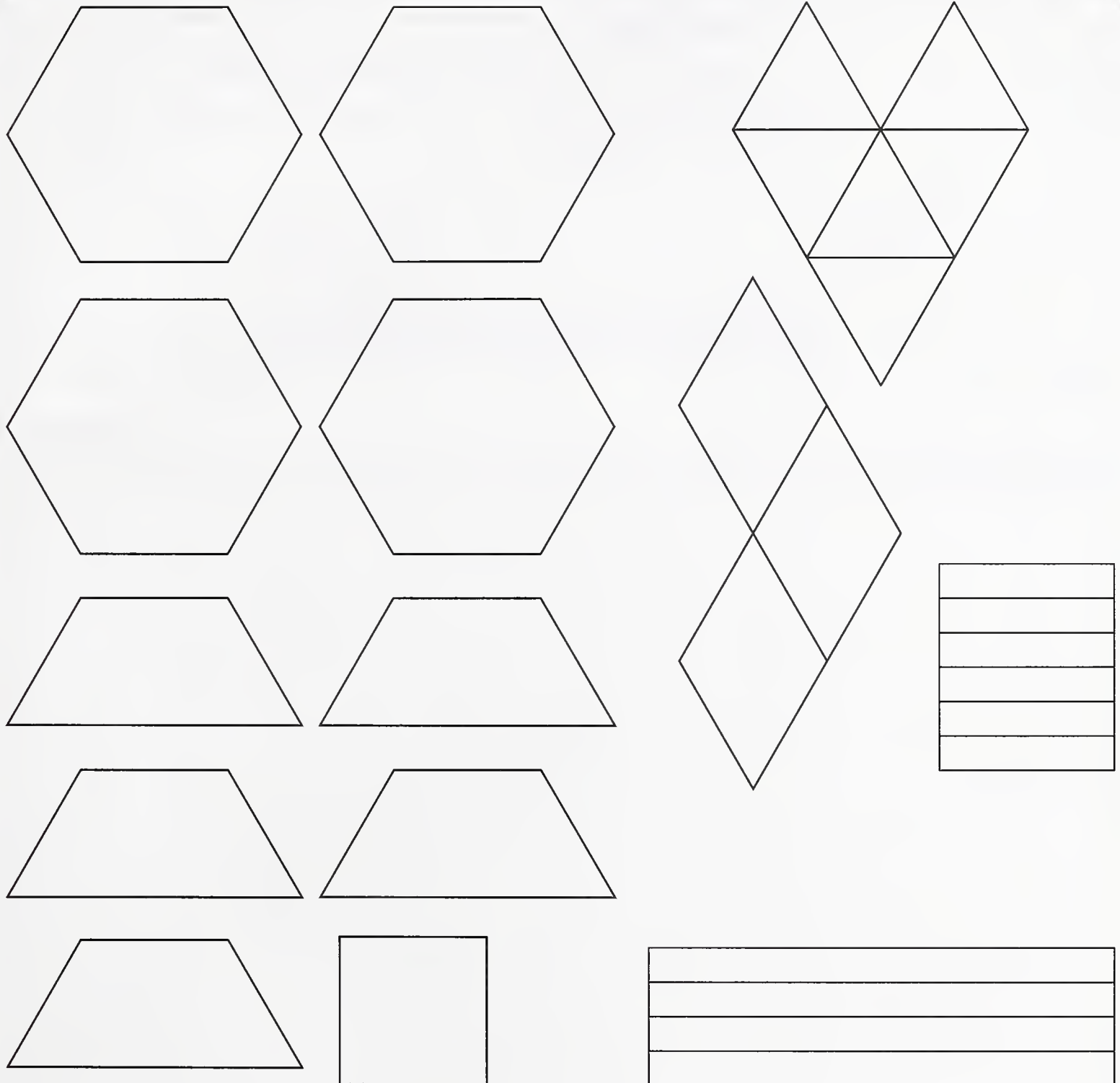
Appendix A:

Mathematics Tool Kit and Reference Sheets

Massachusetts Department of Education

Appendix A

1998-99 Massachusetts Comprehensive Assessment System Grade 4 Mathematics Tool Kit



Appendix A

1998-99 Massachusetts Comprehensive Assessment System Grade 8 Mathematics Reference Sheet

Use the information and ruler below as needed to answer questions in this test.

$$8 \text{ ounces} = 1 \text{ cup}$$

$$2 \text{ cups} = 1 \text{ pint}$$

$$2 \text{ pints} = 1 \text{ quart}$$

$$4 \text{ quarts} = 1 \text{ gallon}$$

$$3 \text{ teaspoons} = 1 \text{ tablespoon}$$

$$16 \text{ tablespoons} = 1 \text{ cup}$$

$$16 \text{ ounces} = 1 \text{ pound}$$

$$2000 \text{ pounds} = 1 \text{ ton}$$

$$1 \text{ mile} = 1760 \text{ yards}$$

$$\text{Perimeter of triangle: } P = a + b + c$$

$$\text{Circumference of circle: } C = 2\pi r$$

OR

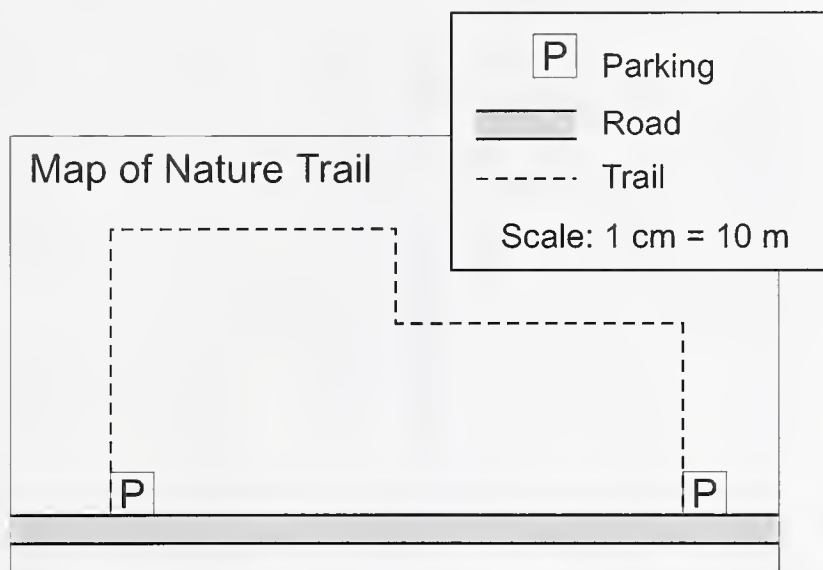
$$C = \pi d$$

$$\text{Area of triangle: } A = \frac{1}{2}bh$$

$$\text{Area of circle: } A = \pi r^2$$



Grade 8 Mathematics Item 30 Actual-Size Graphic



**1998-99 Massachusetts Comprehensive Assessment System
Grade 10 Mathematics Reference Sheet**

AREA FORMULAS

triangle $A = \frac{1}{2}bh$

rectangle $A = bh$

square $A = s^2$

trapezoid $A = \frac{1}{2}h(b_1 + b_2)$

CIRCLE FORMULAS

$C = 2\pi r$

$A = \pi r^2$

SURFACE AREA FORMULAS

sphere $SA = 4\pi r^2$

cube $SA = 6e^2$

cylinder $SA = 2\pi r^2 + 2\pi rh$

VOLUME FORMULAS

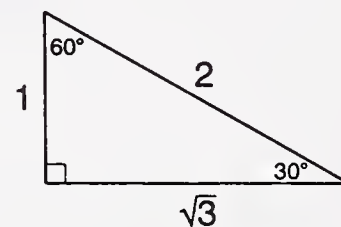
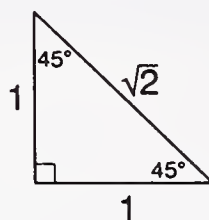
cube $V = e^3$

cylinder $V = \pi r^2 h$

cone $V = \frac{1}{3}\pi r^2 h$

regular prism $V = Bh$ (B = area of the base)

sphere $V = \frac{4}{3}\pi r^3$

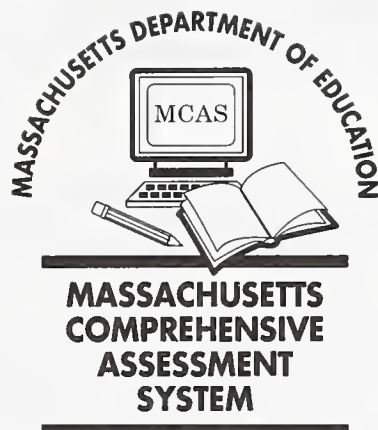


Appendix A

[back of Grade 10 Mathematics Reference Sheet]

Values of the Trigonometric Functions

Angle	Sin	Cos	Tan		Angle	Sin	Cos	Tan
1°	0.0175	0.9998	0.0175		46°	0.7193	0.6947	1.0355
2°	0.0349	0.9994	0.0349		47°	0.7314	0.6820	1.0724
3°	0.0523	0.9986	0.0524		48°	0.7431	0.6691	1.1106
4°	0.0698	0.9976	0.0699		49°	0.7547	0.6561	1.1504
5°	0.0872	0.9962	0.0875		50°	0.7660	0.6428	1.1918
6°	0.1045	0.9945	0.1051		51°	0.7771	0.6293	1.2349
7°	0.1219	0.9925	0.1228		52°	0.7880	0.6157	1.2799
8°	0.1392	0.9903	0.1405		53°	0.7986	0.6018	1.3270
9°	0.1564	0.9877	0.1584		54°	0.8090	0.5878	1.3764
10°	0.1736	0.9848	0.1763		55°	0.8192	0.5736	1.4281
11°	0.1908	0.9816	0.1944		56°	0.8290	0.5592	1.4826
12°	0.2079	0.9781	0.2126		57°	0.8387	0.5446	1.5399
13°	0.2250	0.9744	0.2309		58°	0.8480	0.5299	1.6003
14°	0.2419	0.9703	0.2493		59°	0.8572	0.5150	1.6643
15°	0.2588	0.9659	0.2679		60°	0.8660	0.5000	1.7321
16°	0.2756	0.9613	0.2867		61°	0.8746	0.4848	1.8040
17°	0.2924	0.9563	0.3057		62°	0.8829	0.4695	1.8807
18°	0.3090	0.9511	0.3249		63°	0.8910	0.4540	1.9626
19°	0.3256	0.9455	0.3443		64°	0.8988	0.4384	2.0503
20°	0.3420	0.9397	0.3640		65°	0.9063	0.4226	2.1445
21°	0.3584	0.9336	0.3839		66°	0.9135	0.4067	2.2460
22°	0.3746	0.9272	0.4040		67°	0.9205	0.3907	2.3559
23°	0.3907	0.9205	0.4245		68°	0.9272	0.3746	2.4751
24°	0.4067	0.9135	0.4452		69°	0.9336	0.3584	2.6051
25°	0.4226	0.9063	0.4663		70°	0.9397	0.3420	2.7475
26°	0.4384	0.8988	0.4877		71°	0.9455	0.3256	2.9042
27°	0.4540	0.8910	0.5095		72°	0.9511	0.3090	3.0777
28°	0.4695	0.8829	0.5317		73°	0.9563	0.2924	3.2709
29°	0.4848	0.8746	0.5543		74°	0.9613	0.2756	3.4874
30°	0.5000	0.8660	0.5774		75°	0.9659	0.2588	3.7321
31°	0.5150	0.8572	0.6009		76°	0.9703	0.2419	4.0108
32°	0.5299	0.8480	0.6249		77°	0.9744	0.2250	4.3315
33°	0.5446	0.8387	0.6494		78°	0.9781	0.2079	4.7046
34°	0.5592	0.8290	0.6745		79°	0.9816	0.1908	5.1446
35°	0.5736	0.8192	0.7002		80°	0.9848	0.1736	5.6713
36°	0.5878	0.8090	0.7265		81°	0.9877	0.1564	6.3138
37°	0.6018	0.7986	0.7536		82°	0.9903	0.1392	7.1154
38°	0.6157	0.7880	0.7813		83°	0.9925	0.1219	8.1443
39°	0.6293	0.7771	0.8098		84°	0.9945	0.1045	9.5144
40°	0.6428	0.7660	0.8391		85°	0.9962	0.0872	11.4301
41°	0.6561	0.7547	0.8693		86°	0.9976	0.0698	14.3007
42°	0.6691	0.7431	0.9004		87°	0.9986	0.0523	19.0811
43°	0.6820	0.7314	0.9325		88°	0.9994	0.0349	28.6363
44°	0.6947	0.7193	0.9657		89°	0.9998	0.0175	57.2900
45°	0.7071	0.7071	1.0000		90°	1.0000	0.0000	—



Appendix B:

English Language Arts

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